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ABSTRACT

This curriculum guide is designed for group instruction of secondary students enrolled in one or two semester-long courses in agricultural education. The guide presents units of study in the following areas: (1) soybeans, (2) rice, and (3) orientation. Each of the 17 units of instruction follows a typical format: terminal objective, specific objectives, suggested instructor and student activities, instructional materials, information sheet, transparency masters, assignment sheets, and a student test. (LRA)

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AGRICULTURE EDUCATION

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SOYBEANS and RICE

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PREFACE

This curriculum guide is a suggested method of group instruction for students enrolled in one or two semester-long courses in Agriculture Education.

This material is intended to cover those items which a student will most likely encounter when employed in this given area of agriculture.

Individualized instructional material should be supplemented to this curriculum guide to meet individual and local needs.

This curriculum guide contained herein was performed pursuant to a contract with the Exemplary Section, Division of Vocational, Technical and Adult Education, Arkansas Department of Education.

ACKNOWLEDGEMENT

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SECTION A

UNIT I

LAND PREPARATION

LAND PREPARATION

TERMINAL OBJECTIVE

After completion of this unit, the student should be able to identify different methods and benefits of seedbed preparation. This knowledge will be evidenced through demonstration and by scoring at least 80% on the unit test.

SPECIFIC OBJECTIVES

After completion of this unit the student should be able to:

I. Match terms related to land preparation with correct definition.

II. List seven characteristics of a good seedbed.

III. Name three reasons for tillage.

IV. Name two plowing dates.

V. Name five advantages of fall plowing.

VI. Name two advantages of spring plowing.

VII. List four benefits of primary tillage.

VIII. Name seven advantages of secondary tillage.

IX. Name six pieces of land preparation equipment.

X. List four benefits of reduced tillage.

XI. Name four types of reduced tillage systems.

XII. List four steps in land preparation for rice.

XIII. List three steps in preparing for water seed rice.

LAND PREPARATION

SUGGESTED ACTIVITIES

I. Instructor:
  A. Provide students with objective sheet.
  B. Provide student with information sheet.
  C. Make transparencies.
  D. Discuss terminal and specific objectives.
  E. Discuss information sheet.
  F. Take field trip to machinery dealer.
  G. Give test.

II. Students:
  A. Read objectives.
  B. Study information sheets.
  C. Take test.

INSTRUCTIONAL MATERIALS

I. Included in this unit:
  A. Objectives
  B. Information sheets
  C. Transparency masters
    1. TM 1 - Rotary Hoe and Spike Tooth Harrow
    2. TM 2 - Moldboard Plow
    3. TM 3 - Offset Disk Plow
    4. TM 4 - Row Crop Cultivator
  D. Test
  E. Answers to test

II. References:

A. Hughes, Harold D. and Hensen, Edwin R. Crop Production, New York, New York, The MacMillan Co.

B. Scott, Walter O. and Aldrich, Samuel R. The Farm Quarterly, Cincinnati, Ohio.

LAND PREPARATION

INFORMATION SHEET

I. Terms and definitions:

   A. CROP RESIDUE - The part of the crop that is left on the ground after harvesting.

   B. STUBBLE MULCHING - The tillage beneath the stubble without covering all the residue.

   C. HUMUS - The decomposed plant residue.

   D. EROSION - The removal of the topsoil by wind and water.

   E. GERMINATION - The resumption of growth by the embryo in a seed.

   F. TILLAGE - A type of cultivation used to maintain a loose soil and eliminate weeds.

   G. PRIMARY TILLAGE - First time over the field with land preparation equipment after harvesting.

   H. SECONDARY TILLAGE - Second or final tillage before planting.

   I. TILTH - Condition of the soil aggregate.

II. Seven characteristics of a good seedbed.

   A. Clean

   B. Firm

   C. Flat

   D. Free of weeds

   E. Free of disease

   F. Free of insects

   G. Provides quick germination of seed

III. Three reasons for tillage.

   A. Eliminate weeds

   B. Increase soils chemical and biological conditions for seed germination.

INFORMATION SHEET

- C. Improve physical conditions of tight soil.

IV. Two plowing dates.

- A. Fall plowing
- B. Spring plowing

V. Five advantages of fall plowing.

- A. Increase time for crop residue to decay.
- B. Reduce tillage in the spring.
- C. Improve chances of forming a firm seedbed.
- D. Allow time for soil to crumble from freezing and thawing.
- E. Aids in insect control.

VI. Two advantages of spring plowing.

- A. Aids in controlling erosion.
- B. Adds organic matter.

VII. Four benefits of primary tillage.

- A. Breaks sod.
- B. Buries trash and residue.
- C. Kills weeds.
- D. Loosens the plow layer.

VIII. Seven advantages of secondary tillage.

- A. Firm and pact a coarse, rough seedbed.
- B. Loosen a hard seedbed.
- C. Crush clods.
- D. Chop trash or sod.
- E. Kill weeds
- F. Smooth the seedbed surface.

INFORMATION SHEET

G. Conserve moisture.

IX. Six pieces of land preparation equipment.

   A. Disk plow

   B. Disk

   C. Moldboard plow

   D. Chisel plow

   E. Spring tooth harrow

   F. Spike tooth harrow

X. Four benefits of reduced tillage.

   A. Cuts expenses.

   B. Promotes water entry reducing runoff and erosion.

   C. Controls blowing of surface soils.

   D. Reduces compaction.

XI. Four types of reduced tillage systems.

   A. Mount cultivator sweeps or rotary devices on a tool bar ahead of the planter to smooth the surface and kill weeds.

   B. Spray herbicides-either band or broadcast, as tractor pulls planter over the field.

   C. Harrow once, then plant either as a separate or combined operation.

   D. Planting by aerial means.

XII. Four steps in land preparation for rice.

   A. Disk 4 to 5 inches deep in fall.

   B. Level land.

   C. Use field cultivator just prior to seeding.

   D. If rice is to follow rice:

      1. Disk

INFORMATION SHEET

2. Plow with field cultivator.

3. Rolling with water filled iron roller.

4. Cover with water during fall and winter.

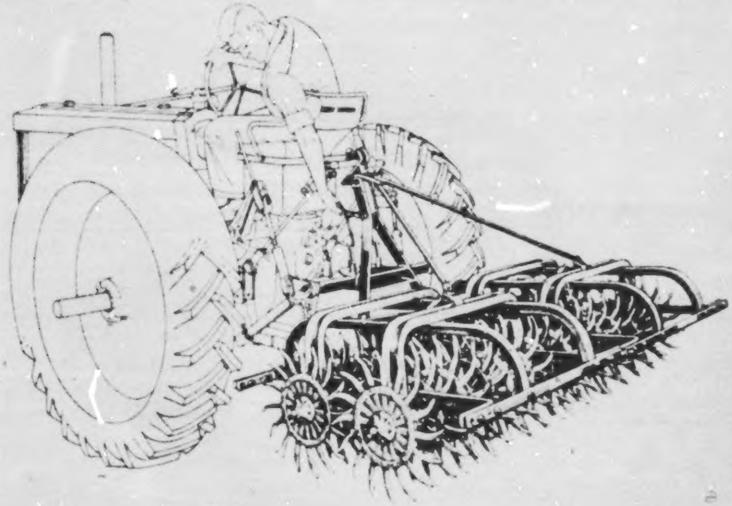
XIII. Steps in preparing for water seeding of rice.

A. Final step only difference.

B. Rough seedbed more desirable.

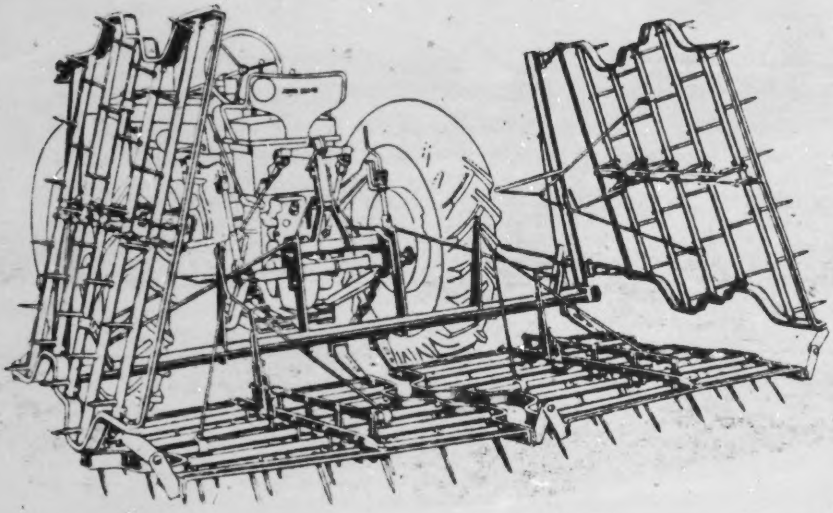
C. Spring tooth harrow to leave shallow furrows and ridges.

Rotary Hoe and Spike Tooth Harrow



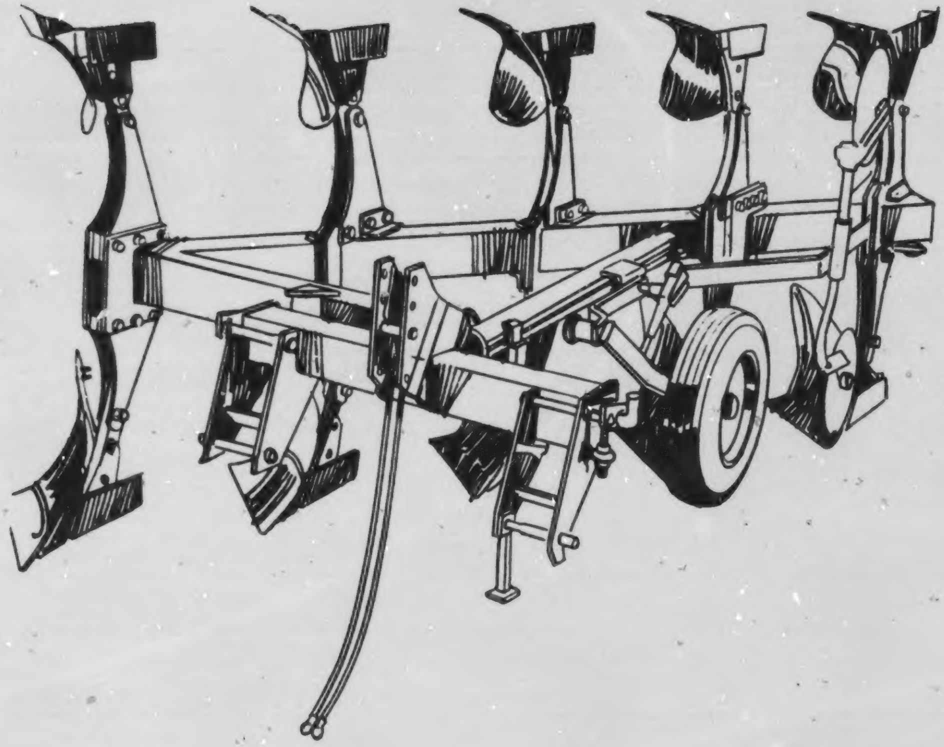
The rotary hoe is most important for cultivation. When weeds are small, the crop well established, and a light crust has formed over the soil, the rotary hoe may be used quite effectively at speeds of 10 or 12 MPH.

Mounted rotary hoe.

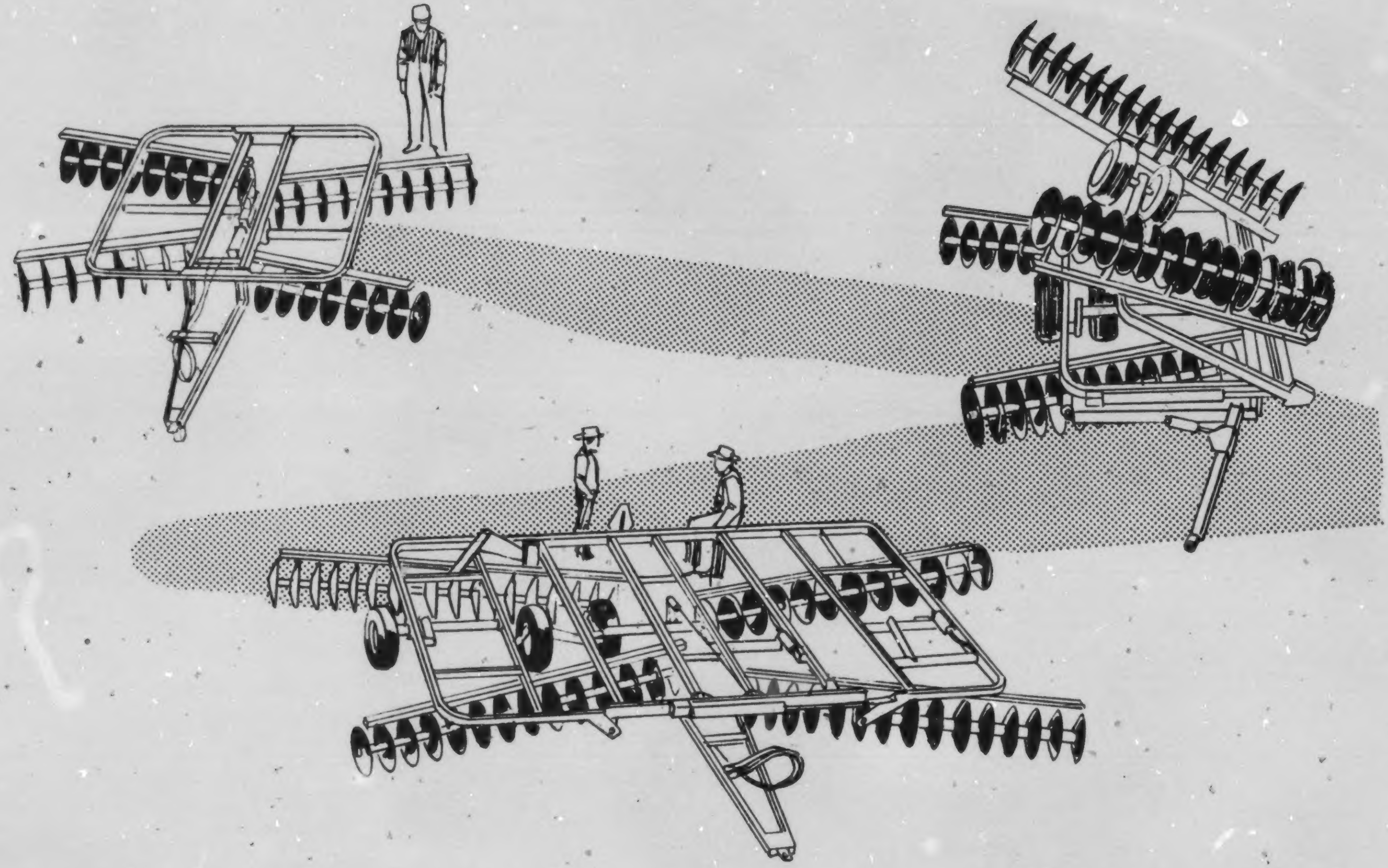


The spike-tooth harrow has lost its former importance for cultivation and is now most used to smooth and level the seedbed either before or after planting.

Moldboard Plow

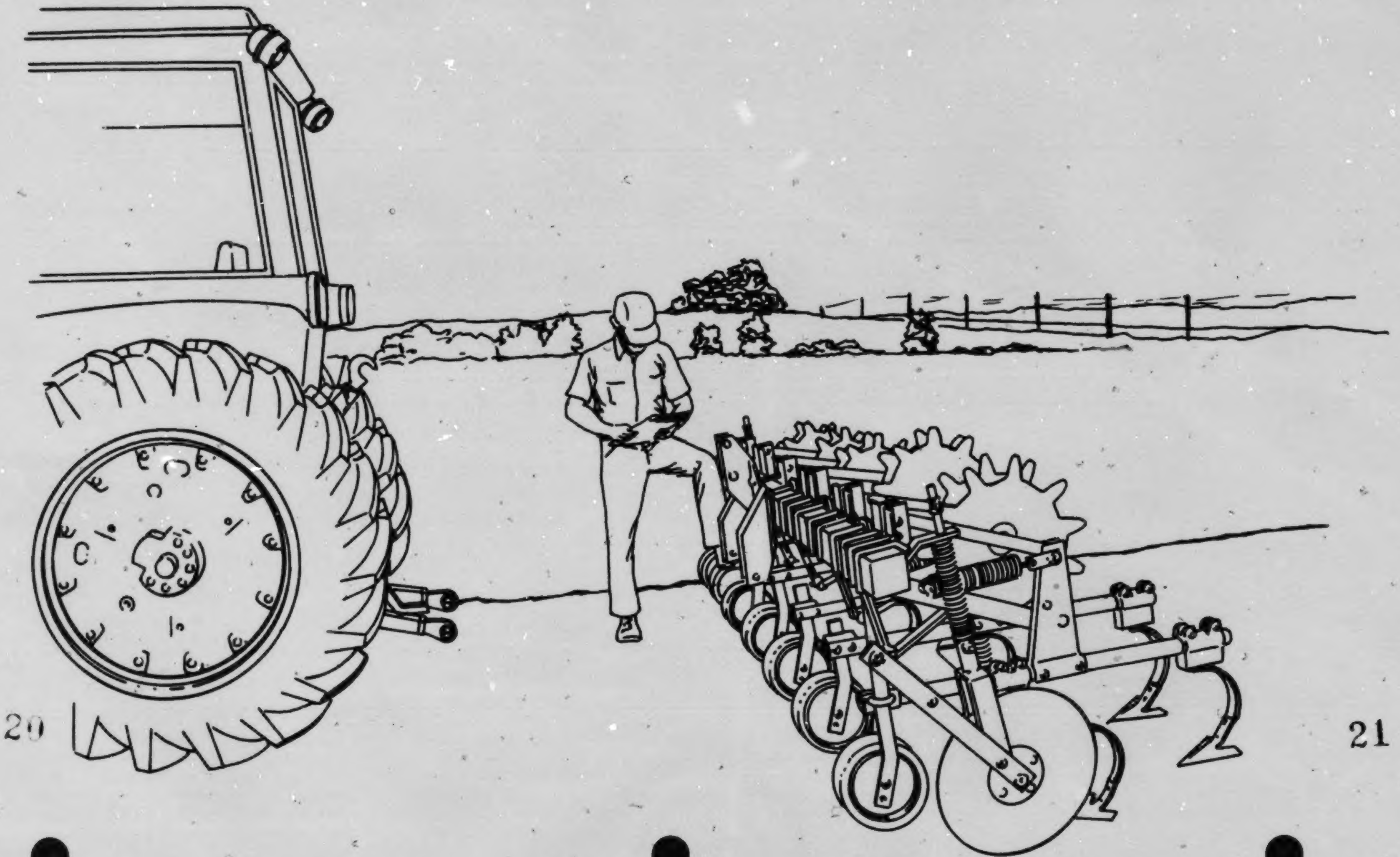


Offset Disk Plow



TM 4

Row Crop Cultivator



LAND PREPARATION

TEST

I. Match the following terms with the correct definition.

___A. Condition of soil aggregates.

___B. The decomposed plant residue.

___C. The resumption of growth by the embryo in a seed.

___D. The removal of the topsoil by wind and water.

___E. The part of the crop that is left on the ground after harvesting.

___F. A type of cultivation used to maintain a loose soil and eliminate weeds.

___G. The tillage beneath the stubble without covering all the residue.

___H. First time over the field with land preparation equipment after harvest.

___I. Second or final tillage before planting.

1. Crop Residue
2. Stubble Mulching
3. Humus
4. Erosion
5. Germination
6. Tillage
7. Primary Tillage
8. Secondary Tillage
9. Tilth

II. List seven characteristics of a good seedbed.

A.

B.

C.

D.

E.

F.

G.

III. Name three reasons for tillage.

A.

B.

C.

IV. Name two plowing dates.

A.

B.

V. Name five advantages of fall plowing.

A.

B.

C.

D.

E.

VI. Name two advantages of spring plowing.

A.

B.

VII. List four benefits of primary tillage.

A.

B.

C.

D.

VIII. Name seven advantages of secondary tillage.

A.

B.

C.

D.

E.

F.

G.

IX. Name six pieces of land preparation equipment.

A.

B.

C.

D.

E.

F.

X. List four benefits of reduced tillage.

A.

B.

C.

D.

XI. Name four types of reduced tillage systems.

A.

B.

C.

D.

XII. List four steps in land preparation for rice.

A.

B.

C.

D.

XIII. List three steps in preparing for water seed rice.

A.

B.

C.

LAND PREPARATION

ANSWERS TO TEST

I. A. 9
   B. 3
   C. 5
   D. 4
   E. 1
   F. 6
   G. 2
   H. 7
   I. 8

II. A. Clean
    B. Firm
    C. Flat
    D. Free of weeds
    E. Free of insects
    F. Free of disease
    G. Provide quick germination of seed

III. A. Eliminate weeds
     B. Increase soils chemical and physical condition for seed germination.
     C. Improve physical conditions of tight soils.

IV. A. Spring
    B. Fall

V. A. Increase time for crop residue to decay.
   B. Reduce tillage in the spring.

C. Improves chances of forming a firm seedbed.

D. Allows time for soil to crumble from freezing and thawing.

E. Aids in insect control.

VI. A. Aids in controlling erosion.

B. Adds organic matter.

VII. A. Break sod.

B. Buries trash and residue.

C. Kills weeds.

D. Loosens the plow layer.

VIII. A. Firm and pack a coarse, rough seedbed.

B. Loosen a hard seedbed.

C. Crush clods.

D. Chop trash or sod.

E. Kills weeds.

F. Smooth the seedbed surface.

G. Conserve moisture.

IX. A. Disk plow

B. Disk

C. Moldboard plow

D. Chisel plow

E. Spring tooth harrow

F. Spike tooth harrow

X. A. Cuts expenses.

B. Promotes water entry reducing runoff and erosion.

C. Controls blowing of surface soil.

D. Reduces compaction.

XI. A. Mount cultivator sweeps or rotary devices on a tool bar ahead of the planter to smooth the surface and kill weeds.

B. Spray herbicides-either band or broadcast, as tractor pulls planter over the field.

C. Harrow once, then plant either as a separate or combined operation.

D. Planting by aerial means.

XII. A. Disk 4 to 5 inches deep in fall.

B. Level land.

C. Use field cultivator just prior to seeding.

D. If rice is to follow rice:

1. Disk

2. Plow with field cultivator.

3. Rolling with water filled from roller.

4. Cover with water during fall and winter.

XIII. A. Final step only difference.

B. Rough seedbed more desirable.

C. Spring tooth harrow to leave shallow furrow and ridges.

SECTION A

UNIT II

VARIETIES AND SEED SELECTION

VARIETIES OF SEED SELECTION

TERMINAL OBJECTIVE

After completion of this unit, the student should be able to discuss the recommended varieties for soybean production as well as factors in seed selection. This knowledge will be evidenced by scoring at least 80% on the unit test.

SPECIFIC OBJECTIVES

After completion of this unit, the student should be able to:

I. Match terms associated with soybean varieties and seed selection.

II. List six factors to consider in selecting high quality seed.

III. Pick from a list the six requirements found on a seed label.

IV. List six factors to consider in selecting a variety.

V. Name the four major recommended groups of soybeans for Arkansas and two varieties from each group.

VARIETIES AND SEED SELECTION

SUGGESTED ACTIVITIES

I. Instructor:

   A. Provide students with objective sheet.

   B. Provide students with information sheet.

   C. Prepare transparencies.

   D. Discuss terminal and specific objectives.

   E. Discuss information and assignment sheet.

   F. Take field trip.

   G. Give test.

   H. Retest if necessary.

II. Students:

   A. Read objective sheet.

   B. Study information sheet.

   C. Demonstrate the ability to accomplish the procedure outlined in the assignment sheet.

   D. Take test.

   E. Review test.

   F. If student has not scored at least 80% on test, review assignment sheets and class discussion.

INSTRUCTIONAL MATERIALS

I. Included in this unit:

   A. Objectives

   B. Information sheets

   C. Transparency masters

      1. TM 1 - Seed Label Requirements

        2. TM 2 - Maturity Groups
        3. TM 3 - Soybean Varieties Recommended for Arkansas

   D. Assignment sheet

        1. Assignment sheet #1 - Soybean Varieties

   E. Answers to assignment sheet

   F. Test

   G. Answers to test

II. References:

A. Scott, Walter O. and Aldrich, Samuel R. Modern Soybean Production, Cincinnati, Ohio, Farm Quarterly, 45210.

B. Soybean Varieties for Arkansas, Leaflet 298.

VARIETIES AND SEED SELECTION

INFORMATION SHEET

I. Terms and definitions:

- A. SEED - A plant embryo and stored food materials surrounded by a seed coat.
- B. VARIETY - A group of individuals within a species that differ from the rest of the species.
- C. BLEND - A mixture of varieties of species.
- D. BRAND - A registered trade mark or trade name selected by a company to distinguish and identify the seed it sells.
- E. LODGING - The inability of a stem to support the top of the plant resulting in the plant falling over.
- F. RESISTANCE - Ability to withstand a disease.
- G. CERTIFIED SEED - The bulk of improved seed for sale for commercial growing.
- H. FOUNDATION SEED - Highest quality seed that can be purchased.
- I. INERT MATTER - The percentage by weight of chaff, broken seeds, stems and soil particles.
- J. SHATTERING - The pod of the bean comes open allowing the seed to fall to the ground.

II. Six factors to consider in selecting high quality seed.

- A. Varietal purity
- B. Germination and vigor
- C. Mechanical purity and inert matter
- D. Weed seed
- E. Other crop seed
- F. Uniformity of size

INFORMATION SHEET

III. Six requirements found on seed labels: (TM 1)

- A. Kind, variety and origin
- B. Lot number
- C. Percentage of purity
- D. Percentage of inert matter
- E. Percentage of weed seed
- F. Percentage of other crop seed

IV. Six factors to consider in selecting a variety:

- A. Plant height suitable for high yields and harvesting.
- B. Lower pod set sufficiently above soil for efficient combining.
- C. Resistance to lodging, shattering and diseases.
- D. Date of maturity suitable for climate conditions of production area. (TM 2)
    - 1. Varieties are divided into nine maturity groups throughtout the United States.
    - 2. Varieties of maturity groups IV, V, VI, and VII are adapted to Arkansas.
- E. High seed quality with a seed coat which does not break easily in harvesting, drying and storage.
- F. Marketing value of the variety.

V. Four major recommended varieties for Arkansas: (TM 3)

- A. Group IV-Very early maturing
    - 1. Clark 63
    - 2. Cluster
- B. Group V-Early maturing
    - 1. Hill

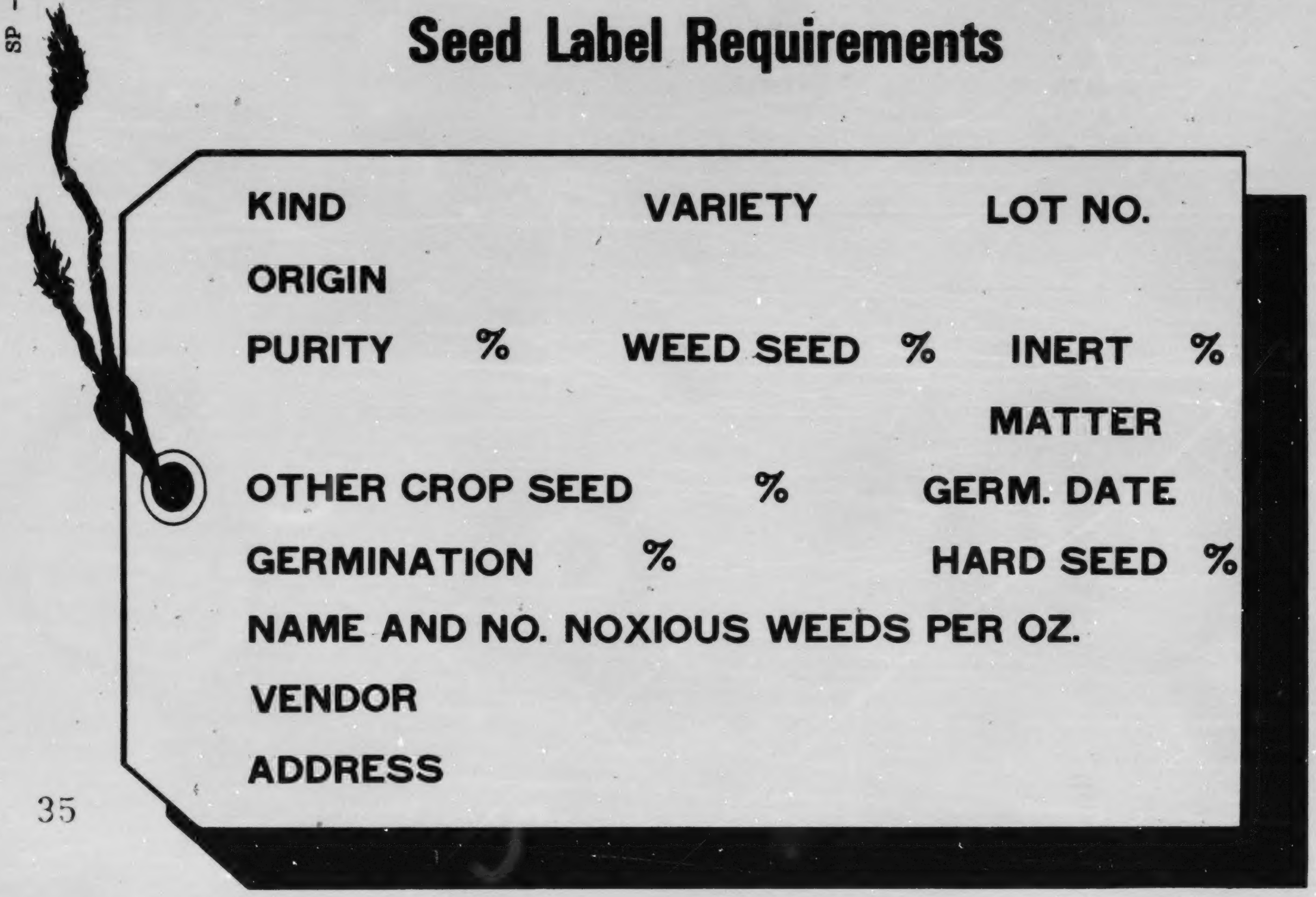
INFORMATION SHEET

   2. Dare
   3. Dyer

C. Group VI-Midseason
   1. Lee
   2. Pickett
   3. Hood
   4. Davis

D. Group VII-Late maturity
   1. Bragg
   2. Semmes

Seed Label Requirements



KIND VARIETY LOT NO.

ORIGIN

PURITY % WEED SEED % INERT MATTER %

OTHER CROP SEED % GERM. DATE

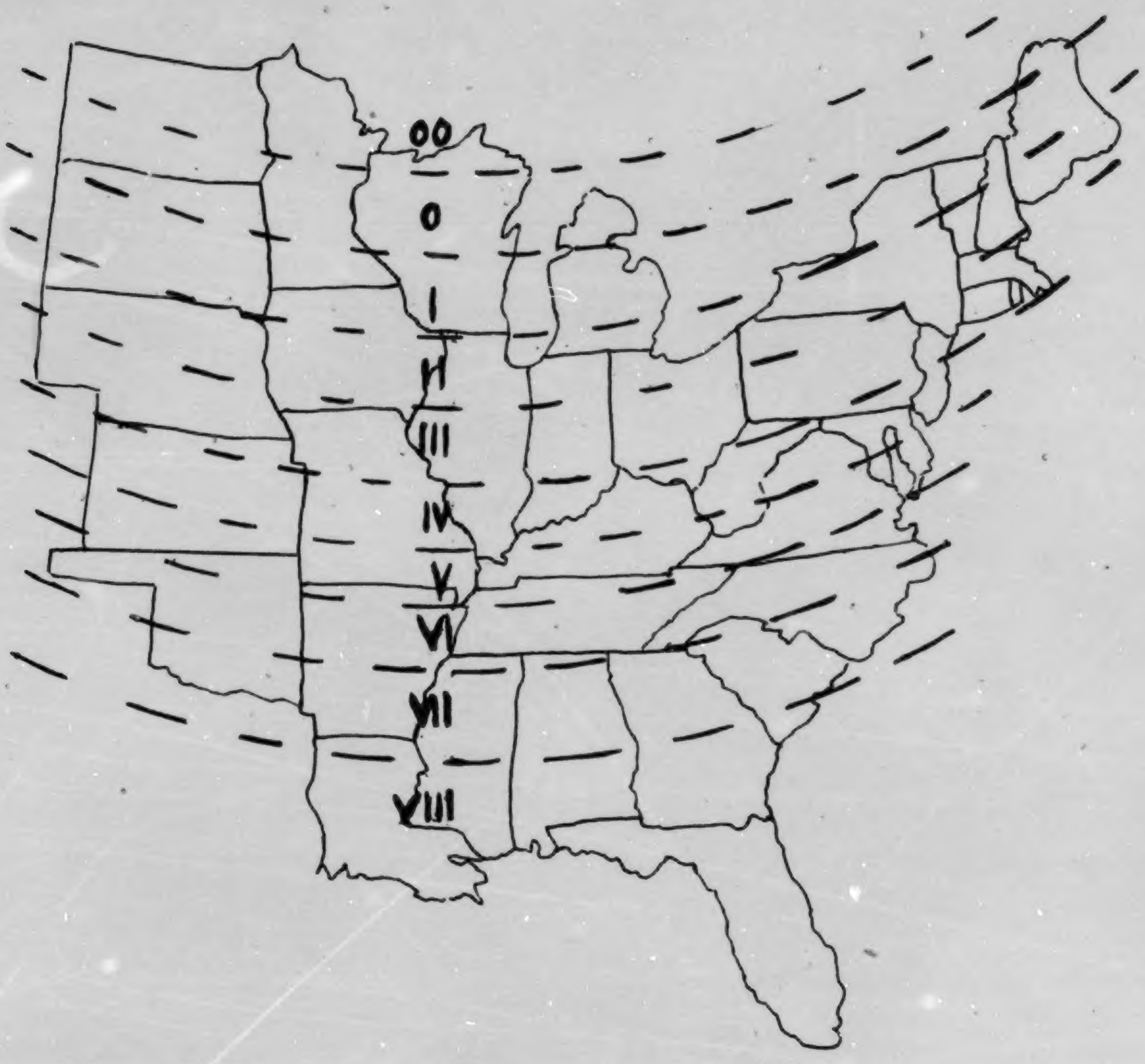
GERMINATION % HARD SEED %

NAME AND NO. NOXIOUS WEEDS PER OZ.

VENDOR

ADDRESS

MATURITY GROUPS


00
0
I
II
III
IV
V
VI
VII
VIII

RECOMMENDED VARIETIES FOR ARKANSAS

Group IV - Very early maturing

1. Clark 63
2. Cluster

Group V - Early maturing

1. Hill
2. Dare
3. Dyer

Group VI - Midseason

1. Lee
2. Pickett
3. Hood
4. Davis

Group VII - Late maturity

1. Bragg
2. Semmes

VARIETIES AND SEED SELECTION

ASSIGNMENT SHEET #1 - SOYBEAN VARIETIES

Survey ten soybean growers in the student area. Find what varieties each grows and reasons why these were selected.

VARIETIES GROWN	REASONS FOR GROWING

VARIETIES AND SEED SELECTION

ANSWERS TO ASSIGNMENT SHEETS

Assignment Sheet #1

A. To the satisfaction of the instructor.

VARIETIES AND SEED SELECTION

TEST

I. Match the terms with the correct definition.

___A. A mixture of varieties of species.

___B. Ability to withstand a disease.

___C. A plant embryo and stored food material surrounded by a seed coat.

___D. The pod of the bean comes open allowing the seed to fall to the ground.

___E. A group of individuals within a species that differ from the rest of the species.

___F. The inability of a stem to support the top of the plant resulting in the plant falling over.

___G. The bulk of the improved seed for sale for commercial growing.

___H. The percentage by weight of chaff, broken seed, stems and soil particles.

___I. A registered trademark or trade name selected by a company to distinguish and identify the seed it sells.

___J. The highest quality seed that can be purchased.

1. Seed
2. Variety
3. Blend
4. Brand
5. Lodging
6. Resistance
7. Certified Seed
8. Foundation Seed
9. Inert Matter
10. Shattering

II. II. List six factors to consider in selecting high quality seed.

A.

B.

C.

D.

E.

F.

III. Pick from the list the six requirements found on a seed label. Place an X in the blank beside the correct answers.

___A. Kind of varieties and origin

___B. Lot number

___C. Color

___D. Percentage of purity

___E. Percentage of water

___F. Percentage of inert matter

___G. Date harvested

___H. Percentage of weed seed

___I. Percentage of other crop seed

___J. Number of seed per pound

IV. List six factors to consider in selecting a variety.

A.

B.

C.

D.

E.

F.

V. Name the four major recommended groups of soybeans for Arkansas and two varieties from each group.

A.

1.

2.

B.

1.

2.

C.

1.

2.

D.

1.

2.

VARIETIES AND SEED SELECTION

ANSWERS TO TEST

I. A. 3

B. 6

C. 1

D. 10

E. 2

F. 5

G. 7

H. 9

I. 4

J. 8

II. A. Varietal purity

B. Germination and vigor

C. Mechanical purity and inert matter

D. Weed seed

E. Other crop seed

F. Uniformity of size

III. A.

B.

D.

F.

H.

I.

IV. A. Plant height suitable for high yields and harvesting.

B. Lower pod set sufficiently above soil for efficient combining.

C. Resistance to lodging, shattering and diseases.

D. Date of maturity suitable for climate conditions of production area. (TM 2)

E. High seed quality with a seed coat which does not break easily in harvesting, drying and storage.

F. Market value of the variety.

V. A. Group IV

1. Clark 63

2. Cluster

B. Group V

1. Hill

2. Dare

C. Group VI

1. Lee

2. Pickett

D. Group VII

1. Bragg

2. Semmes

SECTION A

UNIT III

SOYBEAN PLANTING

SOYBEAN PLANTING

TERMINAL OBJECTIVE

After completion of this unit, the student should be able to discuss plant procedures of soybeans. This knowledge will be evidenced by scoring at least eighty-five percent on the unit test.

SPECIFIC OBJECTIVES

After completion of this unit, the student should be able to:

I. Match terms associated with soybean planting.

II. Discuss in a short paragraph, planting dates.

III. List two factors to consider when determining row spacing in soybeans.

IV. List three factors to consider when determining planting rates.

V. List three factors to consider when determining planting depth.

VI. List four planting systems.

VII. List six advantages of row planting soybeans.

VIII. List five advantages of broadcasting.

IX. Discuss in a short paragraph, inoculating soybeans.

SOYBEAN PLANTING

SUGGESTED ACTIVITIES

I. Instructor:

  A. Provide students with objective sheet.

  B. Provide students with information sheets.

  C. Make transparencies.

  D. Discuss terminal and specific objectives.

  E. Discuss information sheets.

  F. Take field trip.

  G. Give test.

II. Students:

  A. Read objective sheet.

  B. Study information sheets.

  C. Take test.

INSTRUCTIONAL MATERIALS

I. Included in this unit:

  A. Objectives

  B. Information sheets

  C. Transparency masters

    1. TM 1 - Planting Rates For Soybeans

    2. TM 2 - Planting Depths

  D. Test

  E. Answers to test

II. References:

A. Scott, Walker and Aldrich, Samual, Modern Soybean Production, Cincinnati, Ohio, Farm Quarterly.

B. Norman, A.G., The Soybean, New York, Academic Press.

SOYBEAN PLANTING

INFORMATION SHEET

I. Terms and definitions:

A. **INOCULATION** - A material that contains nitrogen fixing bacteria required by the soybean.

B. **RATE** - Number of seed planted.

C. **RHIZOBIA** - Nitrogen fixing bacteria.

D. **LODGING** - Plant falling over due to weakness of stem.

II. Planting dates.

A. Day length determines when to plant soybeans.

B. May is the most satisfactory month for planting in Arkansas.

C. Planting dates range from April 25 to June 15.

D. To early planting results in reduction of plant size.

E. Late planting results in high amounts of high lodging.

F. Soil temperature should be considered when planting 50° or higher.

III. Two factors to consider when determining row spacing in soybeans.

A. Common to plant in row 30-42 inches.

B. Shorter and earlier varieities benefit more from narrow rows.

IV. Three factors to consider when determining planting rates.

A. From 8-10 seeds per foot of row.

B. Number of pounds per acre depends on row width.

C. Too many plants per foot may result in lodging and increase plant height.

INFORMATION SHEET

V. Three factors to consider when determining planting depth.

  A. Important influence on the number of seedlings that emerge.

  B. 1-2 inches recommended depth to plant.

  C. Planting too deep causes hypocotyl to break while pushing the cotyldons up.

VI. Four planting systems.

  A. Hill dropping

  B. Row planting

  C. Drilling

  D. Aerial seeding

VII. Six advantages of row planting soybeans.

  A. Higher yields

  B. Better quality seed

  C. Greater uniformity of stand

  D. Reduced lodging

  E. Lower seed requirements

  F. Better weed control

VIII. Five advantages of broadcasting.

  A. Less labor required

  B. Less soil erosion on sloping soil

  C. Produce a finer more palatable type plant

  D. Fewer cultivation required

  E. More plants shade soil

IX. Inoculating soybeans.

  A. Nitrogen fixing bacteria that lives on soybean roots are native to most soils.

INFORMATION SHEET

B. The best way to introduce the bacteria is to inoculate the seed.

C. Planting seed should be inoculated within two or three hours of planting.

D. Apply inoculant to moist seed.

E. If planting on a field where last years planting seed were inoculated, it is not always necessary to inoculate.

PLANTING RATES FOR SOYBEANS

ROW WIDTH	LBS/PER ACRE
40 INCH	50
30	70
20	80
10	100

SP - 59-A

PLANTING DEPTH

1 — 2 INCHES

SOYBEAN PLANTING

TEST

I. Match terms associated with soybean planting to the correct definition.

A. Inoculation

B. Rate

C. Rhizobia

D. Lodging

1. Plant falling over due to weakness in stem.

2. A material that contains nitrogen fixing bacteria required by the soybean.

3. Nitrogen fixing bacteria.

4. Number of seed planted.

II. Discuss in a short paragraph, planting dates.

III. List two factors to consider when determining row spacing in soybeans.

A.

B.

IV. List three factors to consider when determining planting rates.

A.

B.

C.

V. List three factors to consider when determining planting depth.

A.

B.

C.

VI. List four planting systems.

A.

B.

C.

D.

VII. List six advantages of row planting soybeans.

A.

B.

C.

D.

E.

F.

VIII. List five advantages of broadcasting.

A.

B.

C.

D.

E.

IX. Discuss in a short paragraph, inoculating soybeans.

SOYBEAN PLANTING

ANSWERS TO TEST

I. 1. D

2. A

3. C

4. B

II. Should include the following information.

A. Day length determines when to plant soybeans.

B. May is the most satisfactory month for planting in Arkansas.

C. Planting dates range from April 25 to June 15.

D. To early planting results in reduction of plant size.

E. Late planting results in high amounts of high lodging.

F. Soil temperature should be considered when planting 50° or higher.

III. A. Common to plant in row 30-42 inches.

B. Shorter and earlier varieties benefit more from narrow rows.

IV. A. From 8-10 seeds per foot of row.

B. Number of pounds per acre depends on row width.

C. Too many plants per foot may result in lodging and increase plant height.

V. A. Important influence on the number of seedlings that emerge.

B. 1-2 inches recommended depth to plant.

C. Planting too deep causes hypocotyl to break while pushing the cotlydons up.

VI. A. Hill dropping

C. Drilling

D. Aerial seeding

VII. A. Higher yields

B. Better quality seed

C. Greater uniformity of stand

D. Reduced lodging

E. Lower seed requirements

F. Better weed control

VIII. A. Less labor required

B. Less soil erosion on sloping soil

C. Produce a finer more palatable type plant

D. Fewer cultivation required

E. More plants shade soil

IX. Paragraph should include the following information.

A. Nitrogen fixing bacteria that lives on soybean roots are native to most soils.

B. The best way to introduce the bacteria is to inoculate the seed.

C. Planting seed should be inoculated within two or three hours of planting.

D. Apply inoculant to moist seed.

E. If planting on a field where last years planting seed were inoculated it is not always necessary to inoculate.

SECTION A

UNIT IV

SOYBEAN GROWTH AND REPRODUCTION

SOYBEAN GROWTH AND REPRODUCTION

TERMINAL OBJECTIVE

After completion of this unit, the student should be able to discuss the processes involved in soybean growth and reproduction.

SPECIFIC OBJECTIVES

After completion of this unit, the student should be able to:

I. Match terms associated with soybean growth and reproduction.

II. List six parts of the soybean seed.

III. List the five steps of germination of the soybean.

IV. List three requirements for germination.

V. Pick from a list two major stages of growth.

VI. Discuss in a short paragraph, the vegetative stage.

VII. Discuss in a short paragraph, the flowering stage.

VIII. List three facts about the pod filling period.

IX. Discuss in a short paragraph, the seed filling period.

X. List three facts about maturity of the soybean plant.

SOYBEAN GROWTH AND REPRODUCTION

SUGGESTED ACTIVITIES

I. Instructor:
  A. Provide students with objective sheet.
  B. Provide students with information sheet.
  C. Make transparencies.
  D. Discuss terminal and specific objectives.
  E. Discuss information sheets.
  F. Take field trip.
  G. Give test.

II. Students:
  A. Read objectives
  B. Study information sheet
  C. Take test

INSTRUCTIONAL MATERIALS

I. Included in this unit:
  A. Objectives
  B. Information sheets
  C. Transparency masters
    1. TM 1 - Parts of a Soybean Seed
    2. TM 2 - Germination of a Soybean Seed
  D. Test
  E. Answers to test

II. References:
  A. Scott, Walter and Aldrich, Samuel, Modern Soybean Production, Cincinnati, Ohio, Farm Quarterly.

B. Norman, A.G., The Soybean, New York, ACA Dunic Press.

SOYBEAN GROWTH AND REPRODUCTION

INFORMATION SHEET

I. Terms and definitions:

A. RADICLE - Part of the seed that becomes the primary root.

B. HYPOCOTYL - Part of the stem that pushes the cotyledons above the soil surface.

C. EPICOTYL - The main stem and growing point of the embryo.

D. COTYLEDONS - Food storage structures of the seed.

E. SEED COAT - Protects the embryo from disease and damage.

F. PHOTO PERIOD SENSITIVE - The term used to describe the transition from vegative to flowering stages in direct response to day length.

G. GERMINATION - The changing of a dormant embryo to active status.

H. AXIL - Where the leaf petioles join the main stem or branches of the main stem.

I. RACEME - The flower branch originating at the axil.

J. HILUM - The eye of the seed.

II. Six parts of the soybean seed.TM 1

A. Hilum

B. Cotyledon

C. Radicle

D. Hypocotyl

E. Epicotyl

F. Seed Coat

III. Five steps of germination of the soybean. TM 2

A. Absorption of water and oxygen into seed.

B. Seed swells and seed coat ruptures.

C. Primary root goes down.

D. First internodes goes up.

E. New leaves form and food production starts.

INFORMATION SHEET

IV. Three requirements for germination.

- A. Proper temperature
- B. Sufficient moisture (50%)
- C. Ample supply of oxygen

V. Major stages of growth.

- A. Vegative
- B. Flowering stage

VI. Vegative stage:

- A. Usually first 6-8 weeks of growth
- B. Determines the size of plant
- C. Determines the number of flower position

VII. Flowering stage:

- A. The key to the flowering stage mechanism is the length of darkness during a 24-hour day. (Photo Period Sensitive)
- B. Flowers produced at the axils of the plant.
- C. Flowering stage lasts up to six weeks.
- D. Flowers are self pollinating.
- E. Up to 75 percent of the flowers produced by a plant may fall to the ground.

VIII. Three facts about the pod filling period.

- A. Few pods are set by the earliest flowers.
- B. First pods appear ten days to two weeks after flowering begins.
- C. Usually completed in three weeks.

IX. Seed filling period:

- A. Most critical time in the life of the soybean. Anything that interferes with plant function during this time can reduce yields.

INFORMATION SHEET

B. Moisture stress is very serious.

C. The plant draws about 30 percent of its potassium and 40 percent of its phosphorous and nitrogen from the soil during this period.

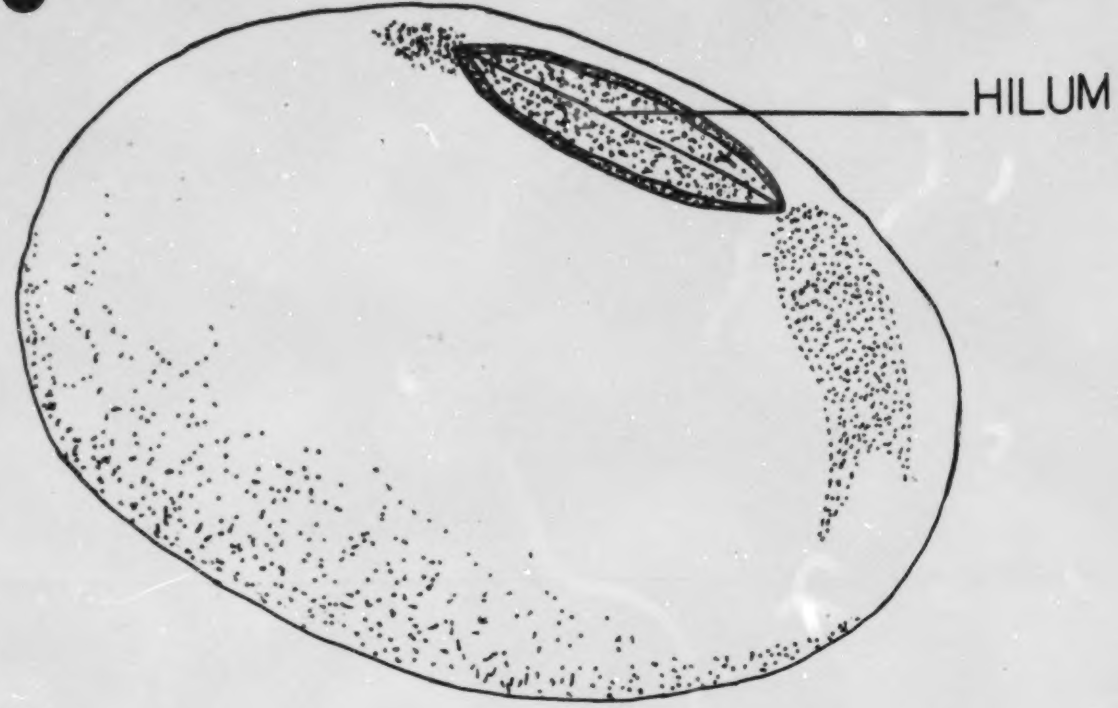
X. Three facts about maturity of the soybean plant.

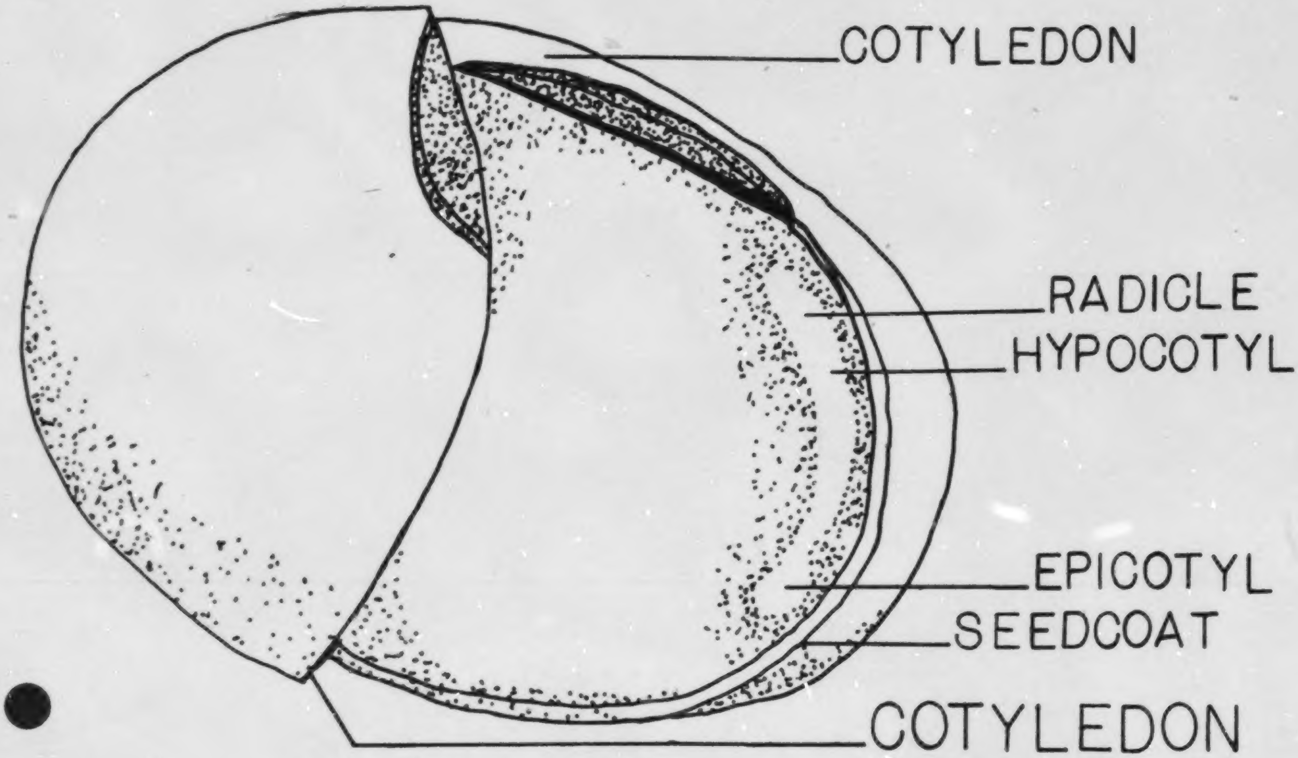
A. A newly formed soybean seed contains 90 percent moisture.

B. A mature soybean seed contains 10 to 15 percent moisture.

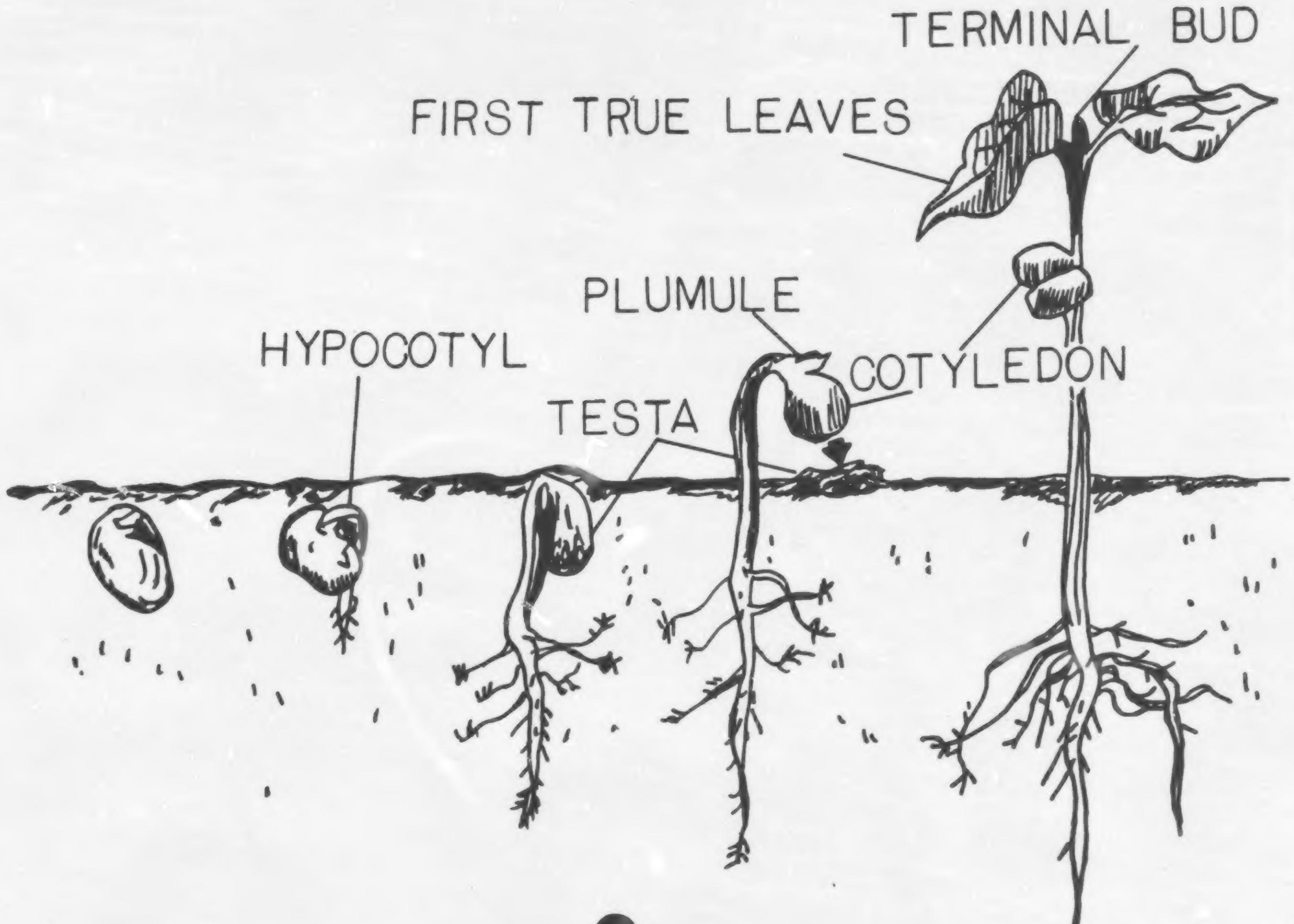
C. A mature plant has a high degree of cold tolerance. The seed remains highly viable after exposure to below-freezing temperature.

SOYBEAN SEED




COTYLEDON
RADICLE
HYPOCOTYL
EPICOTYL
SEEDCOAT
COTYLEDON

GERMINATION OF A SOYBEAN SEED


TERMINAL BUD
FIRST TRUE LEAVES
PLUMULE
HYPOCOTYL
COTYLEDON
TESTA

SOYBEAN GROWTH AND REPRODUCTION

TEST

I. Match the terms listed below to the correct definition.

___1. The main stem and growing point of the embryo.

___2. The food storage structures of the seed.

___3. The changing of a dormant embryo to active status.

___4. Part of the seed that becomes the primary root.

___5. Protect the embryo from disease and damage.

___6. Part of the stem that pushes the cotyledons above the soil.

___7. The term used to describe the transistion from the vegetative to flowering stages in direct response to day length.

___8. The eye or dark spot of the seed.

___9. The flowering branch originating at the axil.

__10. Where the leaf petioles join the main stem or branches of the main stem.

A. Radicle

B. Hypocotyl

C. Epicotyl

D. Cotyledons

E. Seed Coat

F. Photo Period Sensitive

G. Germination

H. Axil

I. Raceme

J. Hilum

II. List the six parts of the soybean seed.

A.

B.

C.

D.

E.

F.

III. List the five steps of germination of the soybean.

A.

B.

C.

D.

E.

IV. List three requirements for germination.

A.

B.

C.

V. Pick from the following list the two major stages of growth by placing an "X" in the correct blank.

___A. Vegetative

___ C. Flowering

___B. Pod Filling

___ D. Maturity

VI. Discuss in a short paragraph, the vegetative stage.

VII. Discuss in a short prargraph, the flowering stage.

VIII. List three facts about the pod filling stage.

A.

B.

C.

IX. Discuss in a short paragraph, the seed filling period.

X. List three facts about maturity of the soybean plant.

A.

B.

C.

SP - 79-A

SOYBEAN GROWTH AND REPRODUCTION

ANSWERS TO TEST

I. 1. C

2. D

3. G

4. A

5. E

6. B

7. F

8. J

9. I

10. H

II. A. Hilum

B. Cotyledon

C. Radicle

D. Hypocotyl

E. Epicotyl

F. Seed Coat

III. A. Absorption of water and oxygen into seed.

B. Seed swells and seed coat ruptures.

C. Primary root goes down.

D. First internodes goes up.

E. New leaves form and food production starts.

IV. A. Proper temperature

B. Sufficient moisture (50%)

C. Ample supply of oxygen

V. A. Vegetative

B. Flowering stage

VI. A. Usually first 6-8 weeks of growth

B. Determines the size of plant

C. Determines the number of flower position

VII. A. The key to the flowering stage mechanism is the length of darkenss during a 24-hour day. (Photo Period Sensitive)

B. Flowers produced at the axils of the plant.

C. Flowering stage lasts up to 6 weeks.

D. Flowers are self pollinating.

E. Up to 75% of the flowers produced by a plant may fall to the ground.

VIII. A. Few pods are set by the earliest flowers.

B. First pods appear ten days to two weeks after flowering begins.

C. Usually completed in three weeks.

IX. A. Most critical time in the life of the soybean.

B. Moisture stress is very serious.

C. The plant draws about 30% of its potassium and 40% of its phosphorous and nitrogen from the soil during this period.

X. A. A newly formed soybean contains 90% moisture.

B. A mature soybean seed contains 10 to 15% moisture.

C. A mature plant has a high degree of cold tolerance. The seed remains highly viable after exposure to below-freezing temperature.

SECTION A

UNIT V

SOYBEAN FERTILIZATION

SOYBEAN FERTILIZATION

TERMINAL OBJECTIVE

After completion of this unit, the student should be able to discuss types of fertilizer and recommendations for applying these fertilizers to soybeans. This knowledge will be evidenced by scoring at least eighty percent on the unit test.

SPECIFIC OBJECTIVES

After completion of this unit, the student should be able to:

I. Match terms associated with soybean fertilizer.

II. Pick from a list the three major nutrients.

III. Pick from a list the three minor nutrients.

IV. List seven micro-nutrients needed by plants.

V. Discuss nitrogen fertilizer and soybeans in a short paragraph.

VI. List five facts about phosphorous fertilizer uptake by the soybean plant.

VII. In a short paragraph, give recommendations for fertilizing soybeans with phosphorous.

VIII. List three facts about potassium in soybeans.

IX. In a short paragraph, give recommendations for applying potassium to soybeans.

X. List two recommendations for lime.

XI. List two facts about molybdenum use in fertilizing soybeans.

XII. List five forms of fertilizer.

XIII. List two ways of placing fertilizer.

XIV. Name two ways of determining fertilizer needs.

SOYBEAN FERTILIZATION

SUGGESTED ACTIVITIES

I. Instructor:
   - A. Provide students with objective sheets
   - B. Provide students with assignment and information sheets
   - C. Make transparencies
   - D. Discuss terminal and specific objectives
   - E. Discuss assignment and information sheets
   - F. Take a field trip
   - G. Give test

II. Students:
   - A. Read objective sheets
   - B. Study information sheets
   - C. Participate in field trip
   - D. Complete assignment sheets
   - E. Take test

INSTRUCTIONAL MATERIALS

I. Included in this unit:
   - A. Objectives
   - B. Information sheets
   - C. Transparency masters
     - 1. TM 1 - Major Nutrients
     - 2. TM 2 - Secondary Nutrients
     - 3. TM 3 - MicroNutrients
     - 4. TM 4 - Phosphorous Uptake by Soybeans

5. TM 5 - Potassium Uptake by Soybeans

D. Test

E. Answers to test

II. References:

A. Hughes, Harold D. and Edwin R. Hensen, Crop Production, New York, New York, The MacMillan Co.

B. Scott, Walter O. and Aldrich, Samuel R., Modern Soybean Production, Cincinnati, Ohio, Farm Quarterly

C. Soybean Fertilization and Liming in Arkansas, Circular No. 54.

SOYBEAN FERTILIZATION

INFORMATION SHEET

I. Terms and definitions:

   A. FERTILIZER - Any natural manufactured or processed material or mixture of material that contains one or more of the recognized plant food elements either liquid or dry.

   B. ACID SOIL - The soil having an acid reaction, the ph is below 7.0.

   C. ANALYSIS - The percent content of (N) nitrogen available (P) phosphorous expressed as P_2O_5 and the amount of water soluble (K) potassium expressed as K_2O.

   D. BRAND - Trade mark of the company which produces the fertilizer.

   E. COMPLETE FERTILIZER - Fertilizer which supplies all three of the major nutrients.

   F. GRADE - The total of the fertilizer analysis.

   G. ORGANIC SOIL - A term used to refer to soils containing 20% or more organic matter.

   H. PH - A term used to indicate the degree of acidity or alkalinity of the soil.

   I. TISSUE TEST - Test ran on plant tissue to determine plant food need of the crop.

   J. LEGUME - A plant which has nitrogen forming bacteria in its root system.

II. Major nutrients required by soybeans. TM 1

   A. Nitrogen - N

   B. Phosphorous - P

   C. Potassium - K

III. Minor nutrients.

   A. Calcium - Cg

   B. Magnesium - Mg

INFORMATION SHEET

   C. Sulfur - S

IV. Seven micronutrients needed by plants.

   A. Boron - B

   B. Chlorine - Cl

   C. Copper - Cu

   D. Iron - Fe

   E. Manganese - Mn

   F. Molybdenum - Mo

   G. Zinc - Zn

V. Nitrogen fertilizer and soybeans.

   A. Nitrogen fertilizer is not recommended for soybeans.

   B. Soybeans are legume.

   C. Nitrogen fertilizer causes the nodules to become less productive.

VI. Five facts about phosphorous fertilizer uptake by the soybean plant.

   A. Soybeans required large amounts of phosphorous.

   B. Take up by plant throughout growing season.

   C. The period of greatest demand starts just before the pods begin to form until 10 days after maturity.

   D. Phosphorous most available to plant at a ph range of 5.5 to 7.0.

   E. At maturity of plant, phosphorous is translocated into the seed from other parts of plant.

VII. Recommendations for fertilizing soybeans with phosphorous.

   A. From 20-45 lbs. of P_2O_5 is recommended at soil test levels of 45 lbs. of phosphorous per acre.

INFORMATION SHEET

VIII. Three facts about potassium in soybean plants.

- A. Required in large amounts.
- B. Potassium is moved from other parts of the plant to the developing seed.
- C. Soybean seed contains sixty percent of the potassium in the plant.

IX. Recommendations for applying potassium to soybeans.

- A. Potassium fertilizer is not recommended at soil test levels above 200 lbs. of potassium per acre.
- B. At 150-200 soil test K, 30-40 lbs. of K_2O per acre is recommended.
- C. At test levels between 60-150 K, 30-60 lbs. of K_2O per acre is recommended.
- D. Below 60 soil test K, from 70 to 90 lbs. of K_2O is recommended.

X. Two recommendations for lime.

- A. Where needed, lime is one of the best investments in soil fertility for soybeans.
- B. Lime is recommended on all soils with a ph below 6.0.

XI. Two facts about molybdenum use in fertilizing soybeans.

- A. Recommended as a seed treatment at the rate of 1/5 to 2/5 ounce per acre.
- B. Not recommended on soils testing below 5.9 ph.

XII. Five forms of fertilizer.

- A. Gas
- B. Liquid
- C. Slurry
- D. Suspension
- E. Solid

INFORMATION SHEET

XIII. Two ways of applying fertilizer to soybeans.

   A. Row placement

   B. Broadcast

XIV. Two ways of determining fertilizer needs.

   A. Soil tests

   B. Tissue tests

MAJOR (PRIMARY) NUTRIENTS

NITROGEN N

PHOSPHORUS P

POTASSIUM K

SP - 91-A

SECONDARY NUTRIENTS

CALCIUM Ca

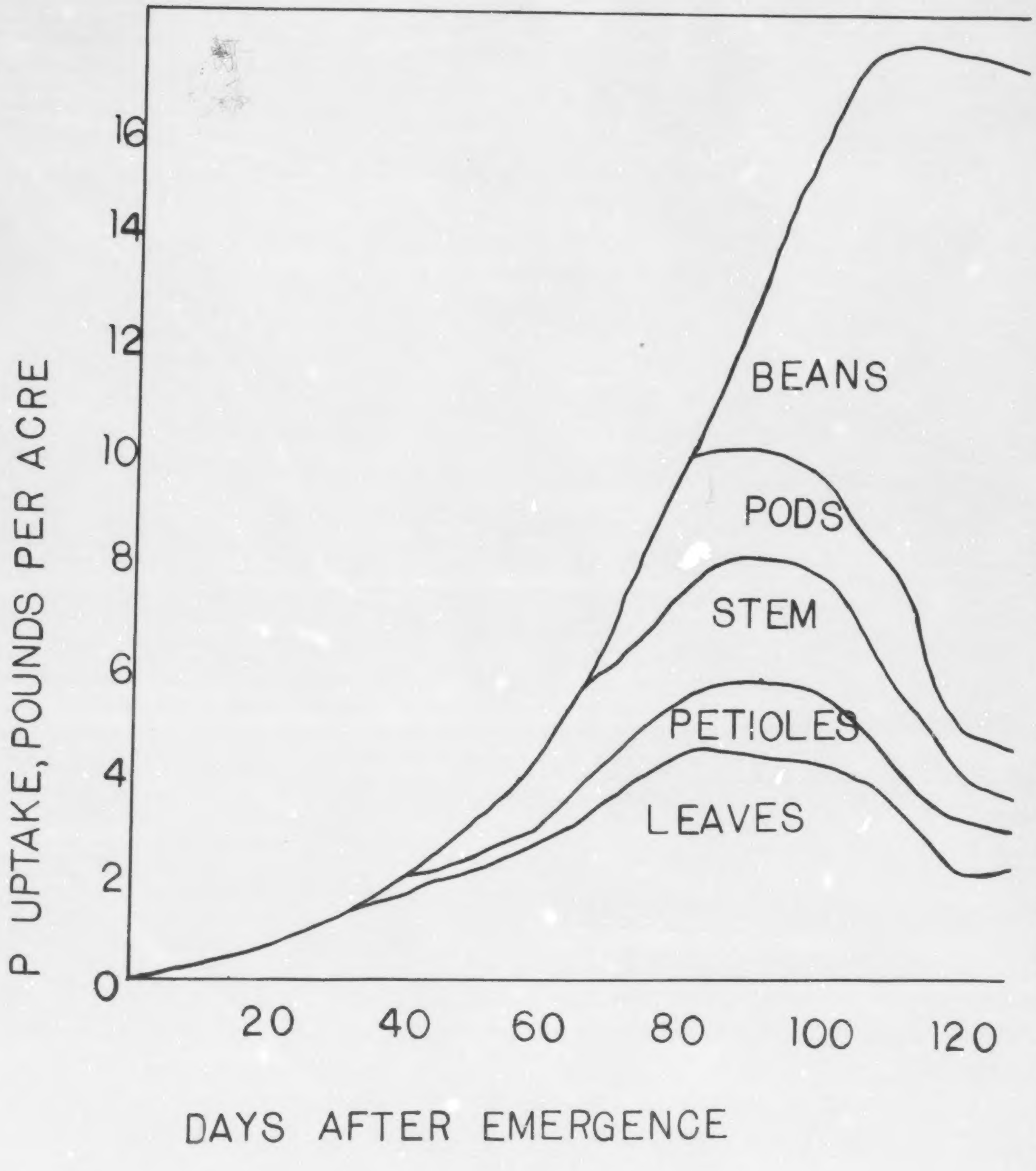
MAGNESIUM Mg

SULFUR S

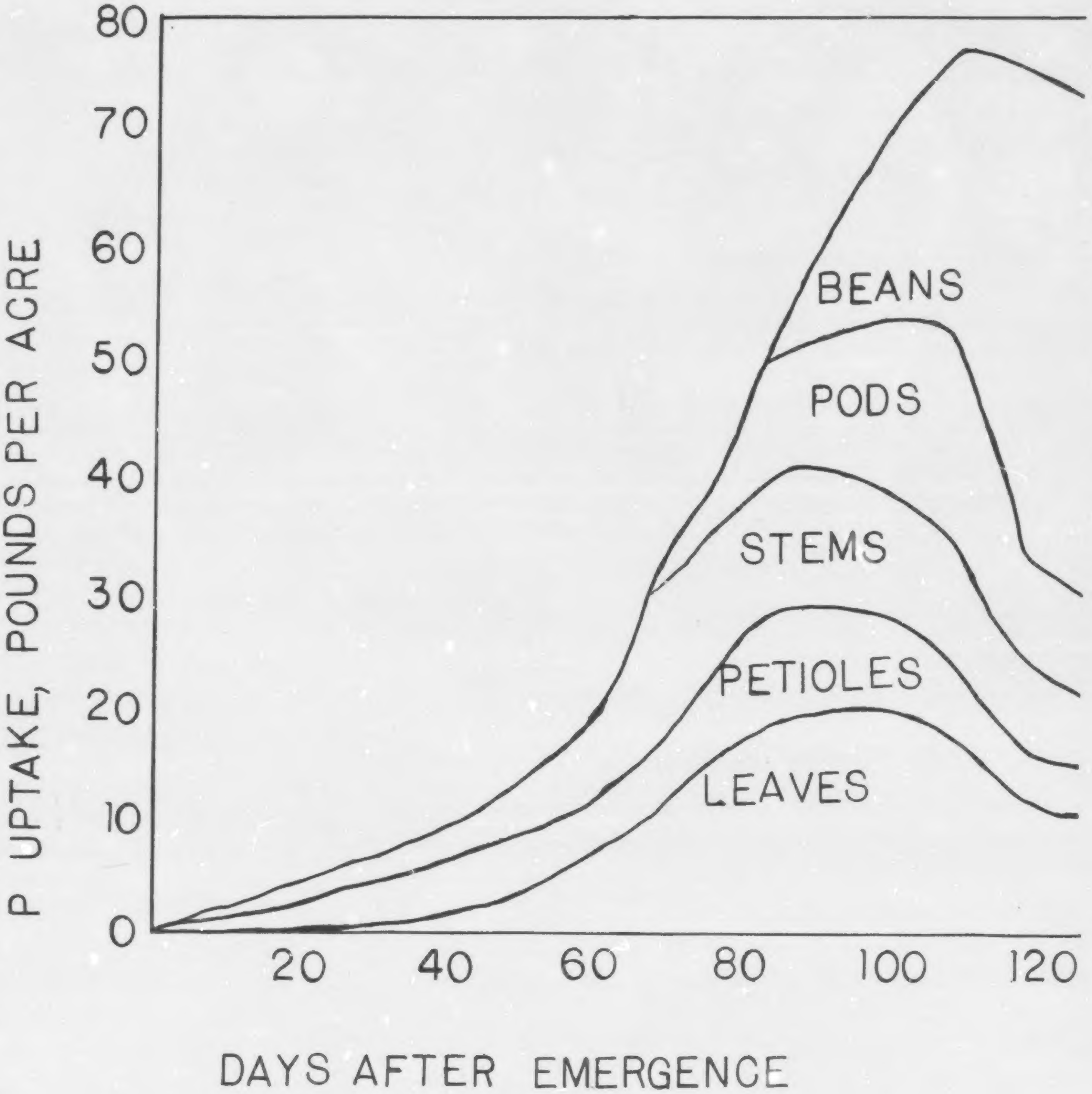
SP - 93-A

MICRONUTRIENTS

BORON	B
CHLORINE	Cl
COPPER	Cu
IRON	Fe
MANGANESE	Mn
MOLYBDENUM	Mo
ZINC	Zn


P UPTAKE, POUNDS PER ACRE
0
2
4
6
8
10
12
14
16
20
40
60
80
100
120
DAYS AFTER EMERGENCE
BEANS
PODS
STEM
PETIOLES
LEAVES

POTASSIUM UPTAKE



SOYBEAN FERTILIZATION

TEST

I. Match the following terms associated with soybean fertilizer.

1. A plant which has nitrogen forming bacteria in its root system.
2. The soil having an acid reaction, the ph is below 7.0.
3. Fertilizer which supplies all three of the major nutrients.
4. A term used to refer to soils containing 20% or more organic matter.
5. The percent content of (N) nitrogen available (P) phosphorous expressed as P_2O_5 and the amount of water soluble (K) potassium expressed as K_2O.
6. The total of the fertilizer analysis.
7. A term used to indicate the degree of acidity or alkalinity of the soil.
8. Any natural manufactured or processed material or mixure that contains one or more of the recognized plant food elements either liquid or dry.
9. Trade mark of the company which produces the fertilizer.
10. Test ran on plant tissues to determine plant food need of the crop.

___A. Fertilizer

___B. Acid Soil

___C. Brand

___D. Analysis

___E. Complete Fertilizer

___F. Grade

___G. Organic Soil

___H. PH

___I. Tissue Test

___J. Legume

II. Pick from the following list the three major plant nutrients by placing an "X" in the appropriate blank.

___A. Nitrogen
___B. Zinc
___C. Potassium
___D. Sulfur
___E. Calcium
___F. Copper
___G. Phosphorous

III. Pick from the following list the three minor plant nutrients by placing an "X" in the appropriate blank.

___A. Nitrogen ___D. Calcium ___G. Sulfur

___B. Water ___E. Copper

___C. Oxygen ___F. Magnesium

IV. List seven micronutrients.

A. D. G.

B. E.

C. F.

V. Discuss in a short paragraph, nitrogen fertilizer and soybeans.

VI. List five facts about phosphorous fertilizer uptake by the soybean plant.

A.

B.

C.

D.

E.

VII. In a short paragraph give recommendations for fertilizing soybeans with phosphorous

VIII. List three facts about potassium fertilizer in soybeans.

A.

B.

C.

IX. In a short paragraph give recommendations for applying potassium to soybeans.

X. List two recommendations for lime.

A.

B.

XI. List two facts about molybdenum use in fertilizing soybeans.

A.

B.

XII. List five forms of fertilizer.

A.

B.

C.

D.

E.

XIII. List two ways of applying fertilizer.

A.

B.

XIV. Name two ways of determining fertilizer needs.

A.

B.

SOYBEAN FERTILIZATION

ANSWERS TO TEST

I. A. 8

B. 2

C. 9

D. 5

E. 3

F. 6

G. 4

H. 7

I. 10

J. 1

II. An "X" should be placed in blanks A. Nitrogen, C. Potassium and G. Phosphorous

III. An "X" should be placed in blanks D. Calcium, F. Magnesium and G. Sulfur

IV. A. Boron - B

B. Chlorine - Cl

C. Copper - Cu

D. Iron - Fe

E. Manganese - Mn

F. Molybdenum - Mo

G. Zinc - Zn

V. Paragraph should include:

A. Nitrogen fertilizer is not recommended for soybeans.

B. Soybeans are legumes.

C. Nitrogen fertilizer causes the nodules to become less productive.

VI. A. Soybeans require large amounts of phosphorous.

B. Take up by plant throughout growing season.

C. The period of greatest demand starts just before the pods begin to form until 10 days after maturity.

D. Phosphorous most available to plant at a ph range of 5.5 to 7.0.

E. At maturity of plant, phosphorous is translocated into the seed from other parts of plant.

VII. Paragraph should include:

A. From 20-45 lbs. of $P_2 0 5$ is recommended at soil test levels of 45 lbs. of phosphorous per acre.

B. Mix with 6-12 inches of soil.

VIII. A. Required in large amounts.

B. Potassium is moved from other parts of the plant to the developing seed.

C. Soybean seed contains sixty percent of the potassium in the plant.

IX. Paragraph should include:

A. Potassium fertilizer is not recommended at soil test levels above 200 lbs. of potassium per acre.

B. At 150-200 soil test K., 30 to 40 lbs. of $K_2 0$ per acre is recommended.

C. At test levels between 60-150 K., 30 to 60 lbs. of $K_2 0$ per acre is recommended.

X. A. Where needed lime is one of the best investments in soil fertility for soybeans.

B. Lime is recommended on all soils with a ph below 6.0.

XI. A. Recommended as a seed treatment at the rate of 1/5 to 2/5 ounce per acre.

B. Not recommended on soils tested below 5.9 ph.

XII. A. Gas

B. Liquid

C. Slurry

D. Suspension

E. Solid

XIII. A. Row placement

B. Broadcast

XIV. A. Soil test

B. Tissue tests

SECTION A

UNIT VI

WEED CONTROL

WEED CONTROL

TERMINAL OBJECTIVE

After completion of this unit, the student should be able to discuss the nature and extent of weed problems. The student should be able to discuss means of controlling weeds in soybeans. This knowledge will be evidenced by scoring at least eighty-five percent on the unit test.

SPECIFIC OBJECTIVES

After completion of this unit, the student should be able to:

I. Match the terms to the correct definition.

II. List five agents that contribute to the spreading of weeds.

III. List four factors for which weeds and soybeans compete.

IV. Name six advantages of controlling weeds.

V. Discuss in writing five cultural methods used to control weeds.

VI. Identify the five herbicide classifications.

VII. Identify four methods of applying chemical treatments.

VIII. List three types of equipment used in applying herbicides.

IX. Name three factors used to determine proper herbicide application.

X. Recognize 10 types of weeds common to Arkansas.

WEED CONTROL

SUGGESTED ACTIVITIES

I. Instructor:

  A. Provide students with objective sheet.

  B. Provide students with information sheets.

  C. Prepare transparencies.

  D. Discuss terminal and specific objectives.

  E. Discuss information and assignment sheets.

  F. Take field trip.

  G. Give test.

  H. Review test.

  I. Retest if necessary.

II. Students:

  A. Read objective sheet.

  B. Study information sheet.

  C. Demonstrate the ability to accomplish the procedures outlined in the assignment sheets.

  D. Take test.

  E. Review test.

  F. Is student has not completed at least eighty percent on test, review assignment sheets and class discussion.

  G. Retake test if necessary.

INSTRUCTIONAL MATERIALS

I. Included in this unit:

  A. Objectives

  B. Information sheets

C. Transparency masters

   1. TM 1 - Recommended Herbicides for Preplant

   2. TM 2 - Recommended Herbicides for Preemergence

   3. TM 3 - Recommended Chemicals for Use as a Postemerge Use

   4. TM 4 - Recommended Chemicals for Use as a Crackling Stage Use

   5. TM 5 - Recommended Chemicals for Use as a Salvage Operation

D. Assignment sheets

   1. Assignment sheet #1 - Weed Identification

E. Answers to assignment sheets

F. Test

G. Answers to test

II. References:

A. Scott, Walter O. and Aldrich, Samuel R., Modern Soybean Production, Cincinnati, Ohio, Farm Quarterly.

B. Cooperative Extension Service, Leaflet 444, Control Weeds Early in Soybeans, University of Arkansas, Division of Agriculture and U.S. Department of Agriculture, Cooperating.

C. Cooperative Extension Service, MP 120, Weeds Common to Row Crops in Arkansas, University of Arkansas, Division of Agriculture and U.S. Department of Agriculture, Cooperative.

D. Leaflet 348, Chemical Preplant Control of Johnson Grass.

E. Leaflet 444, Control Weeds Early in Soybeans.

F. Leaflet 447, Postemergence Weed Control in Soybeans.

WEED CONTROL

INFORMATION SHEET

I. Terms and definitions:

- A. WEED - A plant more harmful than beneficial in its location.
- B. HERBICIDE - A chemical used to control weeds.
- C. ANNUAL - A plant that normally lives for less than one year.
- D. BIENNIAL - A plant germinating one season and producing seed the next.
- E. PERENNIAL - Plant that normally lives for more than two years.
- F. PREPLANT - Applying the herbicide before the crop is planted.
- G. PREEMERGENCE - Apply chemicals before crop emerges.
- H. CRACKLING STAGE - Apply chemicals when plant has just cracked through soil.
- I. POSTEMERGENCE - Apply chemicals after the crop or weed emerges.
- J. SALVAGE - Apply chemicals when weeds have completely over run soybeans.
- K. RHIZOME - A underground stem usually rooting at the node.

II. Five agents that contribute to the spreading of weeds.

- A. Wind
- B. Water
- C. Animals
- D. Man
- E. Equipment

III. Four factors for which weeds and soybeans compete.

- A. Soil nutrients

INFORMATION SHEET

B. Moisture

C. Light

D. Carbon dioxide

IV. Six advantages of controlling weeds.

A. Higher per acre yield

B. Better quality of seed

C. Reduce weeds in the future

D. Reduce equipment trouble and repairs

E. Reduce loss of soybeans due to inefficient combine operation.

F. Decrease labor cost

V. Five cultural weed control methods.

A. Rotation with other clean cultivated crops.

B. Discing

1. Cuts rhizomes into small pieces

2. Disc 6-10 times as 4-6 day intervals helps control weeds.

C. Good seedbed preparation

1. Clean

2. Flat

3. Free of weeds

D. Delayed planting (May 15 - June 15)

1. Several crops of weed seeding have been killed before planting.

2. Soil temperature is warm, enable soybeans to germinate quickly and get established ahead of weeds.

E. Varieties of soybeans resistance to weeds.

1. Vary in thier ability to compete.

INFORMATION SHEET

2. Bragg and Semmes compete with cocklebur and Johnson Grass.

3. Rapidly growing varieites shade row middles and suppress weeds.

4. Good stands provide inter-row shade.

5. Narrow - row soybeans produce shade to inter-row area earlier.

VI. Five herbicide classifications:

A. Preplant

B. Preemergence

C. Crackling stage

D. Postemergence

E. Salvage

VII. Four methods of application of chemical treatment.

A. Broadcast-covers the entire area or field at a uniform rate.

B. Row and band-places chemicals directly over the rows.

C. Spot-places chemicals in limited areas infested with weeds.

D. Directed spray-places spray directly on a certain part of the plant.

VIII. Three types of equipment used in applying herbicides.

A. Airplanes

B. Self-propelled spray equipment

C. Tractor mounted spray equipment

IX. Three factors used to determine when to properly apply herbicide.

A. Climate

1. Temperature

INFORMATION SHEET

    2. Wind
    3. Moisture
  B. Stage of plant growth
  C. Condition of plant

X. Ten common weeds of soybeans.

  A. Cocklebur
  B. Johnson grass
  C. Morning glory
  D. Pigweed (careless weed)
  E. Hempsesbania (coffee bean)
  F. Broadleaf signal grass
  G. Crab grass
  H. Teaweed
  I. Pennsylvania smartweed
  J. Giant foxtail

RECOMMENDED CHEMICALS FOR USE AS A PREPLANT HERBICIDE

CHEMICAL	WEED CONTROL	RATE	TIME TO APPLY	METHOD OF APPLICATION
Treflan	Annual grass weeds and Johnson grass	0.5 to 1 lb./a	From 6 weeks prior to planting to time of planting	Incorporate into top 2 to 3 inches of final seed bed
Paraquat	Annual broadleaf and grass weeds	0.25 to 0.5/1	Use prior to planting on seed bed that are not to be distributed before planting	
Lasso	Ragweed Red rice	3.5 lbs./a	During final seed bed preparation (within 7 days of planting)	Incoporated 2-3 inches deep

See County Agent for additional recommendations

RECOMMENDED CHEMICALS FOR USE AS A PREEMERGENCE HERBICIDE

CHEMICAL	WEED	RATE	TIME OF APPLICATION	METHOD
Lasso	Most small seed annuals	2 to 3.0 lbs./a	At planting	Spray directly over drill. Plant seed at least 1½" deep.
Loroy	Same as above	0.75 to 2.5 lbs./a	At planting	Same as above
Maloran	Same as above	1.0 to 3.0 lbs./a	At planting	Same as above

Actual Material
See County Agent for additional recommendations

RECOMMENDED CHEMICALS FOR USE AS A POSTEMERGENCE HERBICIDE

CHEMICAL	WEED	RATE	TIME	METHOD
Basagran	Cocklebur Smartweed Ragweed Prickly side	0.75 to 1.0 lbs./a	When soybeans are in 1 to 4 trifoliate stage most effective on cocklebur 6" or less	Over top or semi-directed excellent spray coverage necessary
Premerge	Cocklebur	.375 to .75 lbs./a	After first trifoliate leaf has fully expanded and second is beginning to unfold	Over top spray

See County Agent for additional recommendations
Recommendations subject to change

RECOMMENDED CHEMICALS FOR USE AS A CRACKLING STAGE HERBICIDE

CHEMICAL	WEED	RATE	TIME	METHOD
Dyanap	Most weed cocklebur annual morning glory	1.5 to 3.0 lbs./a	Soil crackling stage to before true leaves open	Do not use at temperatures above 95° F. and/or when sailor plant is wet. Avoid use during stress periods of soybean
Lasso and Premerge	Same as above	1.5 to 3.0 lbs./a		Same as above

Actual material
See County Agent for additional information

RECOMMENDED CHEMICALS FOR USE AS A SALVAGE HERBICIDE

CHEMICAL	WEED	RATE	TIME	METHOD
2-4 - DB	Common of cocklebur	0.2 lbs./a	Apply 7-14 days before bloom to mid bloom of soybean	Cocklebur must be growing actively and should canopy soybeans to minimize soybean inquiry.

Actual material
See County Agent for additional information

WEED CONTROL

ASSIGNMENT SHEET #1 - WEED IDENTIFICATION

Complete the following form. Collect and identify ten problem weeds found in soybeans.

NAME OF WEED	CHARACTERISTICS

WEED CONTROL

ANSWERS TO ASSIGNMENT SHEETS

Assignment sheet #1

To the satisfaction of the instructor.

WEED CONTROL

TEST

I. Match the following terms to the correct definition.

___1. A plant that normally lives for less than one year.

___2. A plant more harmful than beneficial in its location.

___3. A plant germinating one season and producing seed the next.

___4. A chemical used to control weeds.

___5. A plant that normally lives for more that two years.

___6. Applying chemicals before the crop emerges.

___7. Apply chemicals when plant is just cracking through soil.

___8. Apply chemicals before the crop is planted.

___9. Apply chemical after crop or weed emerges.

___10. Apply chemical when weeds have completely over run soybeans.

___11. An underground stem usually rooting at the node.

A. Weed

B. Herbicide

C. Annual

D. Biennial

E. Perennial

F. Preplant

G. Preemergence

H. Crackling Stage

I. Postemergence

J. Salvage

K. Rhizome

II. List five agents that contribute to the spreading of weeds.

A.

B.

C.

D.

E.

III. List four factors for which weeds and soybeans compete.

A.

B.

C.

D.

IV. Name six advantages of controlling weeds.

A.

B.

C.

D.

E.

F.

V. Discuss in writing five cultural methods used to control weeds.

A.

B.

C.

D.

E.

VI. Identify five herbicide classifications.

A.

B.

C.

D.

VII. Identify four methods of applying chemical treatments.

A.

B.

C.

D.

VIII. List three types of equipment used in applying herbicides.

A.

B.

C.

IX. Name three factors used to determine proper herbicide.

A.

B.

C.

X. Turn in assignment sheet #1.

WEED CONTROL

ANSWERS TO TEST

I. 1. C
2. A
3. D
4. B
5. E
6. G
7. H
8. F
9. I
10. J
11. K

II. A. Wind
B. Water
C. Animals
D. Man
E. Equipment

III. A. Soil nutrients
B. Moisture
C. Light
D. Carbon dioxide

IV. A. Higher per acre yield
B. Better quality of seed
C. Reduce weeds in the future
D. Reduce equipment trouble and repairs
E. Reduce loss of soybeans due to inefficient combine operation.

F. Decrease labor cost

V. A. Rotation with other clean cultivated crops
   B. Discing
   C. Good seedbed preparation
   D. Delayed planting
   E. Varieties of soybeans resistance to weeds

VI. A. Preplant
   B. Preemergence
   C. Crackling Stage
   D. Postemergence
   E. Salvage

VII. A. Broadcast
   B. Rows and band application
   C. Spot
   D. Directed spray

VIII. A. Airplanes
   B. Self-propelled spray equipment
   C. Tractor mounted spray equipment

IX. A. Climate
   B. Stage of plant growth
   C. Condition of plant

X. Completed to instructors satisfaction

SECTION A

UNIT VII

SOYBEAN DISEASES

SOYBEAN DISEASES

TERMINAL OBJECTIVE

After completion of this unit, the student should be able to recognize and control the major diseases of soybeans. This knowledge will be evidenced through demonstration and by scoring at least eighty-five percent on the unit test.

SPECIFIC OBJECTIVES

I. Match terms associated with soybean diseases to correct definition.

II. Name five methods of controlling soybean diseases.

III. Select from a list, the five major groups of soybean diseases.

IV. Classify a disease as either fungus, bacteria, nematode or a virus.

V. Construct a chart, when given the disease, telling symptoms of the disease and method of control.

VI. Survey the soybean diseases common in your area.

SOYBEAN DISEASES

SUGGESTED ACTIVITIES

I. Instructor:

  A. Provide students with objective sheet.
  B. Provide students with information sheets.
  C. Prepare transparencies.
  D. Discuss terminal and specific objectives.
  E. Discuss information and assignment sheets.
  F. Take field trip.
  G. Give test.
  H. Review test.
  I. Retest, if necessary.

II. Students:

  A. Read objective sheet.
  B. Study information sheet.
  C. Demonstrate the ability to accomplish the procedure outlined in the assignment sheet.
  D. Take test.
  E. Review test.
  F. If student has not completed at least eighty percent on test, review assignment sheets and class discussion.
  G. Retake test, if necessary.

INSTRUCTIONAL MATERIALS

I. Included in this unit:

  A. Objectives
  B. Information sheets

C. Transparency masters

  1. TM 1 - Fungus Diseases

  2. TM 2 - Nematode Diseases

D. Assignment sheets

  1. Assignment sheet #1 - Discuss Identification

E. Answers to assignment sheets

F. Test

G. Answers to test

II. References:

A. Scott, Walter O. and Aldrich, Samuel R., Modern Soybean Production, Cincinnati, Ohio, Farm Quarterly.

B. Leaflet 292, Soybean Diseases and Thier Control

C. Leaflet 565, Root Knot Nematodes and Thier Control

SOYBEAN DISEASES

INFORMATION SHEET

I. Terms and definitions:

   A. FUNGUS - A plant which lacks chlorophyll and obtains its food from other plant matter, dead or alive.

   B. BACTERIA - One-celled microorganism which may be disease producing.

   C. VIRUS - A minute, protein-like substance capable of causing mosiac and other diseases.

   D. RESISTANT - The inherited ability of a plant to retard growth of disease organisms.

   E. BLIGHT - The rapid discoloration and death of tissue over certain portions of the plant.

   F. HOST - The plant in which the disease lives and obtains food.

   G. DISEASE - A condition other than normal for a plant.

   H. NEMATODE - Minute parasitic unsegmented worms.

   I. GALL - The enlarged area (Knot) of the root caused by nematodes.

   J. LESION - A localized spot of diseased tissue.

II. Five methods of controlling soybean diseases.

   A. Use of resistant varieties

   B. Treatment of soils

   C. Rotation of crops

   D. Destruction of plant residue

   E. Use of disease-free seed

III. Five major groups of soybean diseases.

   A. Fungus (TM 1)

      1. Brown spot

INFORMATION SHEET

2. Frog eye
3. Target spot
4. Downy mildew
5. Phytophthora root and stem rot

B. Bacteria

1. Bacteria pustule
2. Bacterial blight
3. Wildfire

C. Virus

1. Soybean mosiac
2. Yellow mosiac
3. Bud blight
4. Bean pod mottle virus

D. Nematode (TM 2)

1. Nematode
2. Cyst nematode

E. Non-parasitic diseases

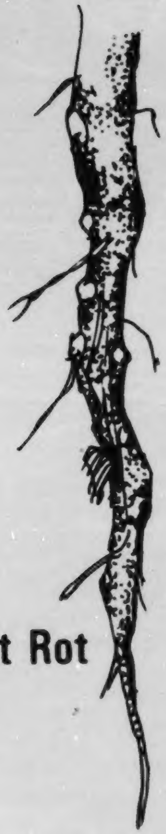
1. Potassium deficiency
2. 2-4D, 4S-T and other herbicide injury
3. Lighting injury

IV.

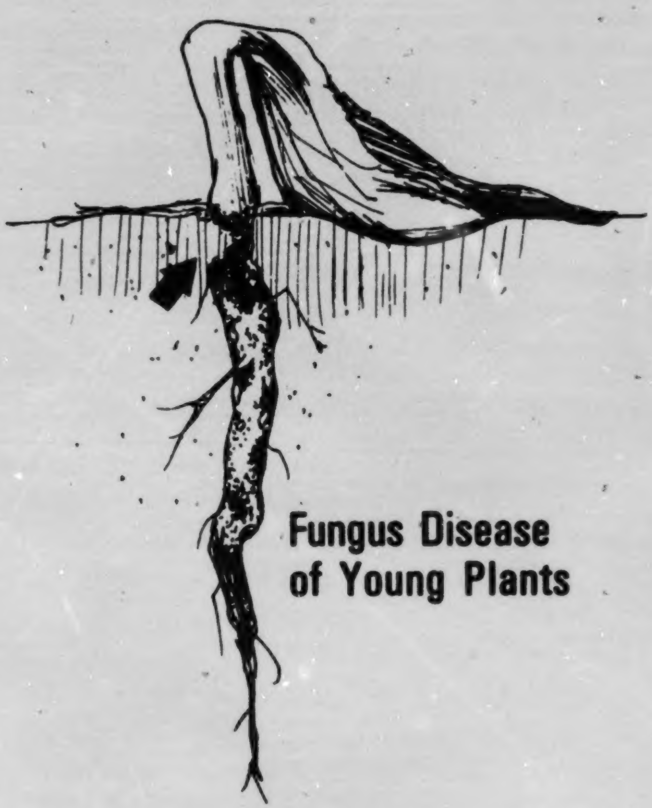
DISEASE	SYMPTOM	CAUSE	CONTROL
Bacterial Pustule	Yellow-green spots with reddish-brown center. Center portion is raised and develops a small pustule on the under side of the leaf.	Bacteria	Use resistant varieties Hill, Hood, Lee, Bragg and Davis: Rotate for at least one year with other crops: Certified Seed
Bacteria Blight	Small angular, yellow spots that become brown.	Bacteria	Cultural practices
Pod and Stem Blight	Small, black pimples appear on the stem and pods.	Fungus	Complete coverage of crop residue in the fall, the use of certified seed and crop rotation.
Phytophyhora Root and Stem Rot	Favored by cool, rainy weather attack in all stages of growth wilt and root & stem rot yellowing.	Fungus	Use resistant varieties Davis, Lee 68 and Semmes. Land leveling to insure good drainage.
Anthracnose	Infects stem, pods of plants nearing maturity blank pods round near maturity.	Fungus	Certified seed Cover crop residue

DISEASE	SYMPTOM	CAUSE	CONTROL
Nematodes	Know like swelling or galls on the roots, plants die before maturity.	Eel Worms	Rotation with non-susceptible crops, summer fallow soil fumigation.
Cyst Nematodes	Same as above	Female nematodes	Prevent movement of soil from infested areas. Fumigation resistant varieties.

Fungus Diseases

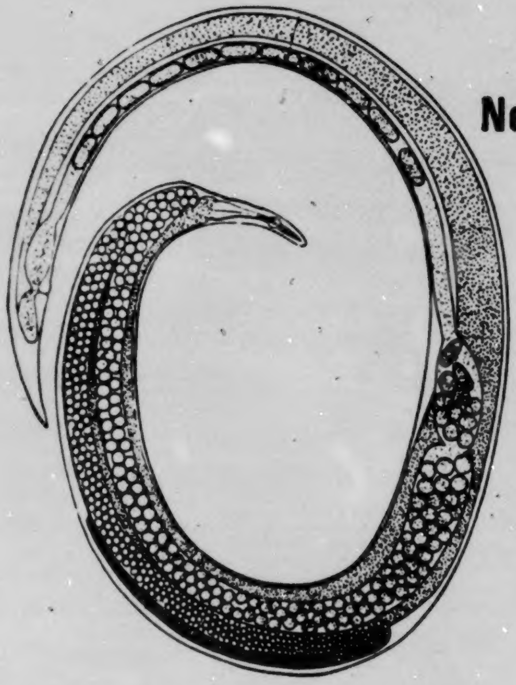


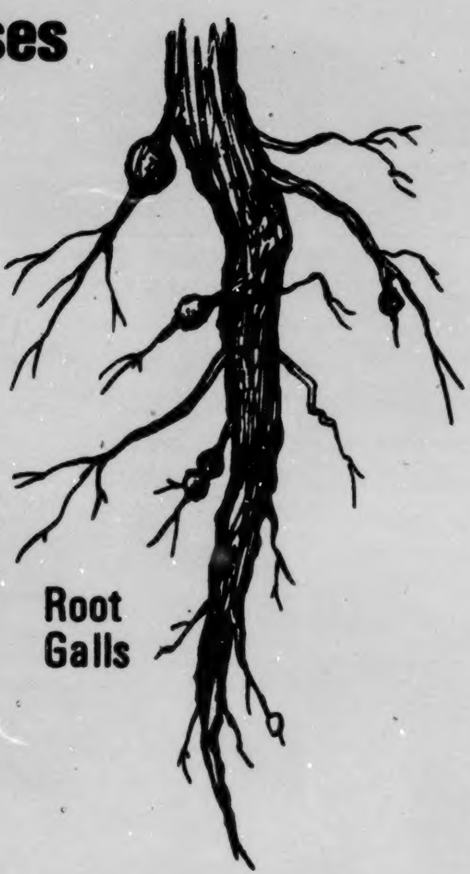
Root Rot



Fungus Disease
of Young Plants

Nematode Diseases





SOYBEAN DISEASES

ASSIGNMENT SHEET #1 - DISCUSS IDENTIFICATION

Collect and identify five types of diseases that are common to soybeans.

PLACE COLLECTED	NAME OF DISEASE	CONTROL MEASURE

SOYBEAN DISEASES

ANSWERS TO ASSIGNMENT SHEETS

Assignment sheet #1

To the satisfaction of the instructor.

SOYBEAN DISEASES

TEST

I. Match the terms with the correct definition.

___1. A minute, protein-like substance capable of causing mosiac and other diseases.

___2. The rapid discoloration and death of tissue over certain portions of the plant.

___3. A minute parasitic unsegmented worm.

___4. The enlarged area (Knot) of the root caused by nematodes.

___5. One cell microorganism which may be disease producing.

___6. A plant which lacks chlorophyll and obtains its food from other plants dead or alive.

___7. The plant in which the disease lives and obtains food.

___8. A condition other than normal for a plant.

___9. A localized spot of diseased tissue.

___10. The inherited ability of a plant to retard growth of disease organism.

A. Fungus
B. Bacteria
C. Virus
D. Resistant
E. Blight
F. Host
G. Disease
H. Gall
I. Nematode
J. Lesion

II. Name five ways of controlling soybean diseases.

A.

B.

C.

D.

E.

III. Select form a list, the five major groups of soybean diseases. Place an "X" in the blank beside the correct answers.

____ Fungus

____ Chlorosis

____ Virus

____ Bacteria

____ Host

____ Nematodes

____ Non-Parasitic

____ Blight

____ Lesion

IV. Classify the following diseases as fungus, virus, bacteria or nematodes. Place an "F" for fungus, "V" for virus, "B" for bacteria and "N" for nematode.

___1. Brown Spot

___2. Wildfire

___3. Frogeye

___4. Soybean Mosiac

___5. Target Spot

___6. Bacteria Pustule

___7. Cyst Nematode

___8. Bud Blight

___9. Downy Mildew

___10. Phytophthora Root and Stem Rot

V. Construct the chart telling symptoms of the disease and method of control.

	SYMPTOM	CAUSE	CONTROL
Bacterial Pustule			
Bacteria Blight			
Pod and Stem Blight			
Phytophthora Root and Stem Rot			
Nematodes			
Cyst Nematodes			

VI. Turn in assignment sheet #1.

SOYBEAN DISEASES

ANSWERS TO TEST

I. 1. C
2. E
3. I
4. H
5. B
6. A
7. F
8. G
9. J
10. D

II. A. Use of resistant varieties
B. Treatment of soils
C. Rotation of crops
D. Destruction of plant residue
E. Use of disease-free seed

III. Fungus
Virus
Bacteria
Nematode
Non-Parasitic

IV. 1. F
2. B
3. F
4. V
5. F
6. B
7. N
8. V
9. F
10. F

V.

DISEASE	SYMPTOM	CAUSE	CONTROL
Bacterial Pustule	Yellow-green spots with reddish-brown center. Center portion is raised and develops a small pustule on the under side of the leaf.	Bacteria	Use resistant varieties Hill, Hood, Lee, Bragg and Davis: Rotate for at least one year with other crops: Certified Seed
Bacteria Blight	Small angular, yellow spots that become brown.	Bacteria	Cultural practices
Pod and Stem Blight	Small, black pimples appear on the stem and pods.	Fungus	Complete coverage of crop residue in the fall, the use of certified seed and crop rotation.
Phytophyhora Root and Stem Rot	Favored by cool, rainy weather attack in all stages of growth wilt and root & stem rot yellowing.	Fungus	Use resistant varieties Davis, Lee 68 and Semmes. Land leveling to insure good drainage.
Anthracnose	Infects stem, pods of plants nearing maturity blank pods round near maturity.	Fungus	Certified seed Cover crop residue

DISEASE	SYMPTOM	CAUSE	CONTROL
Nematodes	Know like swelling or galls on the roots, plants die before maturity.	Eel Worms	Rotation with non-susceptible crops, summer fallow soil fumigation.
Cyst Nematodes	Same as above	Female nematodes	Prevent movement of soil from infested areas. Fumigation resistant varieties.

VI. Answer to satisfaction of instructor.

SECTION A

UNIT VIII

HARVESTING AND STORAGE OF SOYBEANS

HARVESTING AND STORAGE OF SOYBEANS

TERMINAL OBJECTIVE

After completion of this unit, the student should be able to discuss harvesting and storage of soybeans. This knowledge will be evidenced through demonstration and by scoring at least eighty-five percent on the unit test.

SPECIFIC OBJECTIVES

After completion of this unit, the student should be able to:

I. Match terms associated with harvesting and storage of soybeans.

II. List three facts to consider in deciding harvesting date in soybeans.

III. List two types of combines.

IV. List four key steps to consider to reduce losses in harvesting.

V. Discuss in a short paragraph the five major types of losses in harvesting soybeans.

VI. List three major causes of losses in harvesting.

VII. List three key factors in storing soybeans.

VIII. List four major causes of loss in storage.

IX. Discuss in a short paragraph, artificial drying of soybeans.

X. List two major advantages of artificial drying of soybeans.

HARVESTING AND STORAGE OF SOYBEANS

SUGGESTED ACTIVITIES

I. Instructor:

- A. Provide students with objective sheet.
- B. Provide students with information sheet.
- C. Prepare transparencees.
- D. Discuss terminal and specific objectives.
- E. Discuss information and assignment sheets.
- F. Take field trip.
- G. Give test.

II. Students:

- A. Read objective sheet
- B. Study information sheet
- C. Take test

INSTRUCTIONAL MATERIALS

I. Included in this unit:

- A. Objectives
- B. Information sheets
- C. Transparency masters
    - 1. TM 1 - Types of Combines
    - 2. TM 2 - Areas That Account For Grain Loss
    - 3. TM 3 - Flow of Materials Through A Combine
- D. Test
- E. Answers to test

II. References:

A. Scott, Walter O. and Aldrich, Samuel R., Modern Soybean Production, Concincinnati, Ohio, Farm Quarterly.

B. John Martin, Leonard Warren and David Stamp, Principles of Field Crop Production, London, Collier MacMillian Publisher.

HARVESTING AND STORAGE OF SOYBEANS

INFORMATION SHEET

I. Terms and definitions:

   A. SHATTERING - The pod of the bean comes open allowing the seed to fall to the ground.

   B. LODGING - The inability of a stem to support the top of the plant resulting in the plant falling over.

   C. COMBINE - A machine used to harvest and thresh all kinds of grain in a variety of crop and field conditions.

II. Three factors to consider in deciding harvesting dates in soybeans.

   A. Below 14% moisture

   B. Mature

   C. Hard dough stage and leaves turn yellow

III. Three types of combines.

   A. Pull type

   B. Self-propelled

   C. Hillside

IV. Four key steps to consider to reduce losses in harvesting.

   A. Know where losses commonly occur.

   B. Know how to quickly measure these losses.

   C. Know what losses are considered reasonable from the various machine components.

   D. Know what machine adjustments and operating practices.

V. Major types of losses in harvesting soybeans.

   A. Cutter bar loss

   B. Cylinder loss

   C. Separating loss

INFORMATION SHEET

D. Shatter loss

E. Cleaning loss

VI. Three major causes of losses in harvesting.

A. Improper adjustment of machinery

B. Clogging of machinery

C. Lodging

VII. Three key factors in storing soybeans.

A. Store at 13% moisture or less

B. Store in a clean, dry bin

C. Seed should be free of trash and other foreign materials.

VIII. Four major causes of loss in storage.

A. Molds

B. Insects

C. High moisture contents

D. Too high temperature

IX. Artificial drying of soybeans.

A. Soybeans harvested at 14% or more moisture should be dry before storage.

B. Maximum temperature for drying.

1. Seed bean 110°F

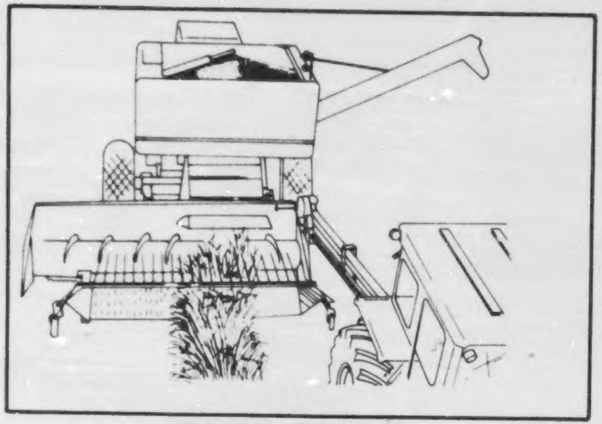
2. Market bean 130° to 140°

X. Two major advantages of artificial drying of soybeans.

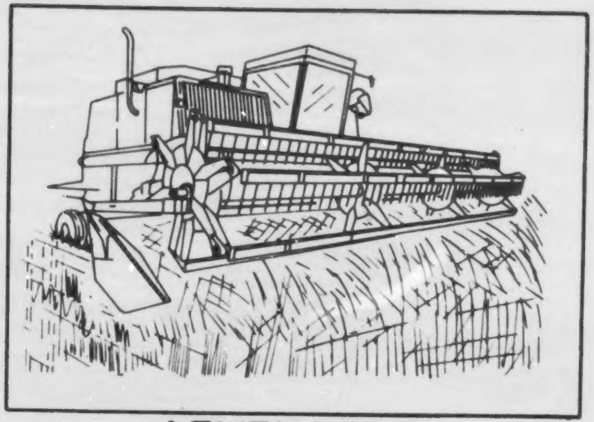
A. Done anytime regardless of weather.

B. Allows soybean to be harvested earlier.

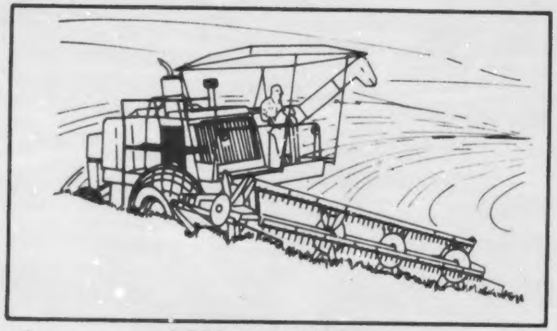
TYPES OF COMBINES



PULL-TYPE



LEVEL-LAND



HILLSIDE

AREAS THAT ACCOUNT FOR GRAIN LOSS

A. SHATTER LOSS

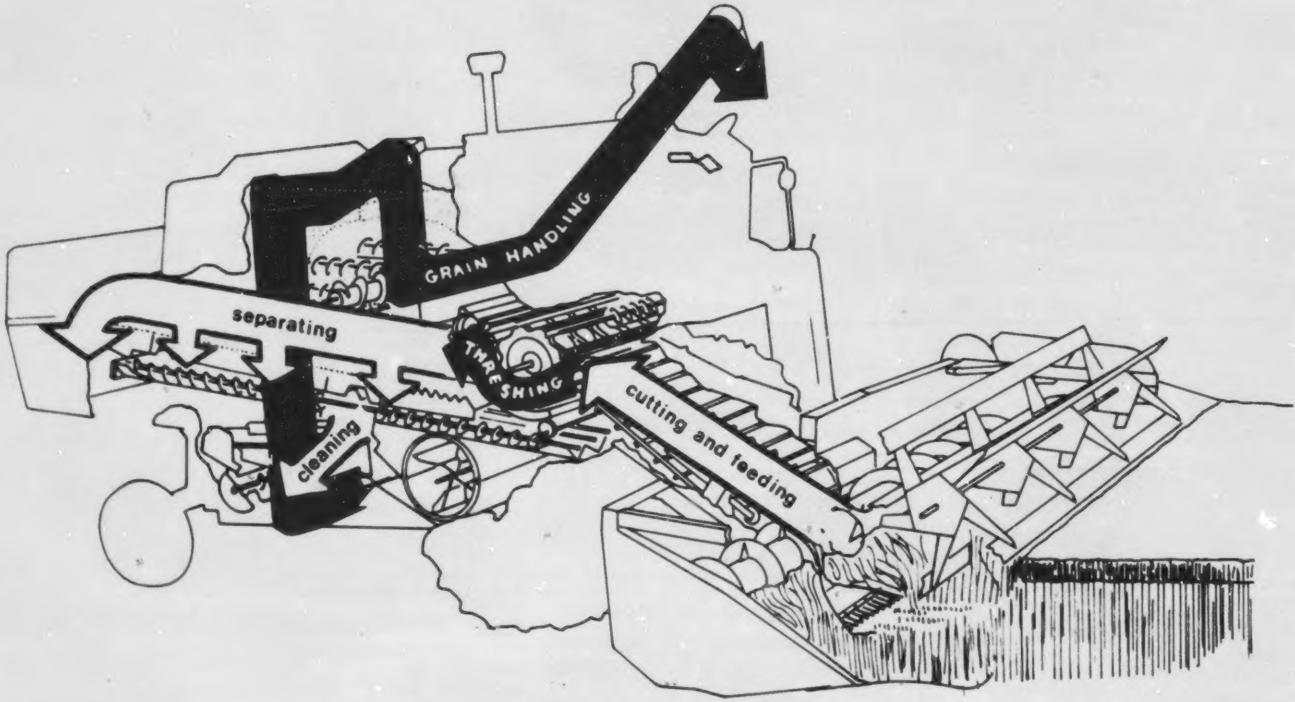
B. CUTTER-BAR LOSS

C. CYLINDER LOSS

D. SEPERATING LOSS

E. CLEANING LOSS

FLOW OF MATERIALS THROUGH A COMBINE


GRAIN HANDLING
separating
THRESHING
cutting and feeding
cleaning

HARVESTING AND STORAGE OF SOYBEANS

TEST

I. Match terms associated with harvesting and storage of soybeans to the correct definition.

___A. Shattering

___B. Lodging

___C. Combine

1. The inability of a stem to support the top of the plant resulting in the plant falling over.

2. A machine used to harvest and thresh all kinds of grain in a variety of crop and field conditions.

3. The pod of the bean comes open allowing the seed to fall to the ground.

II. List three factors to consider in deciding harvesting dates in soybeans.

A.

B.

C.

III. List two types of combines.

A.

B.

IV. List four key steps to consider to reduce losses in harvesting.

A.

B.

C.

D.

V. Discuss in a short paragraph, the five major types of losses in harvesting soybeans.

VI. List three major causes of losses in harvesting.

A.

B.

C.

VII. List three key factors in storing soybeans.

A.

B.

C.

VIII. List four major causes of loss in storage.

A.

B.

C.

D.

IX. Discuss in a short paragraph, artificial drying of soybeans.

X. List two major advantages of artificial drying of soybeans.

A.

B.

HARVESTING AND STORAGE OF SOYBEANS

ANSWERS TO TEST

I. A. 3

B. 1

C. 2

II. A. Below 14% moisture

B. Mature

C. Hard dough stage and leaves turn yellow

III. Any two of the following:

A. Pull type

B. Self-propelled

C. Hillside

IV. A. Know where losses commonly occur.

B. Know how to quickly measure these losses.

C. Know what losses are considered reasonable from the various machine components.

D. Know what machine adjustments and operating practices.

V. A. Cutter bar loss

B. Cylinder loss

C. Separating loss

D. Shatter loss

E. Cleaning loss

VI. A. Improper adjustment of machinery

B. Clogging of machinery

C. Lodging

VII. A. Store at 13% moisture or less

B. Store in a clean, dry bin

C. Seed should be free of trash and other foreign materials.

VIII. A. Molds

B. Insects

C. High moisture contents

D. Too high temperature

IX. Paragraph should include:

A. Soybeans harvested at 14% or more moisture should be dry before storage.

B. Maximum temperature for drying.

1. Seed bean 110° F

2. Market bean 130° to 140°

X. A. Done anytime regardless of weather

B. Allows soybean to be harvested earlier.

SECTION B

UNIT I

VARIETIES AND SEED SELECTION OF RICE

VARIETIES AND SEED SELECTION OF RICE

TERMINAL OBJECTIVE

After completion of this unit, the student should be able to discuss the recommended varieties for rice producers as well as factors in seed selection. This knowledge will be evidenced by scoring at least eighty-five percent on the unit test.

SPECIFIC OBJECTIVES

After completion of this unit, the student should be able to:

I. Match terms associated with rice varieties and seed selection.

II. List six factors to consider in selection of high quality seed.

III. List six factors to consider in selecting a variety.

IV. List three grain types of rice.

V. List three varieties of each type.

VARIETIES AND SEED SELECTION OF RICE

SUGGESTED ACTIVITIES

I. Instructor:
  - A. Provide students with objective sheet.
  - B. Provide students with information sheet.
  - C. Make transparencies.
  - D. Discuss terminal and specific objectives.
  - E. Discuss information sheet.
  - F. Take field trip.
  - G. Give test.

II. Students:
  - A. Read objectives
  - B. Study information sheets
  - C. Take unit test

INSTRUCTIONAL MATERIALS

I. Included in this unit:
  - A. Objectives
  - B. Information sheets
  - C. Transparency masters
    - 1. TM 1 - Rice Varieties Grown in Arkansas
    - 2. TM 2 - Performance of Recommended Varieties
    - 3. TM 3 - Reaction to Disease
  - D. Assignment sheet
    - 1. Assignment sheet #1 - Survey for Varieties and Seed Selection

E. Answers to assignment sheets

F. Test

G. Answers to test

II. References:

A. Rice in the United States: Varieties and Production, Washington, D.C., Agriculture Handbook 289, Agriculture Research Service, U.S. Department of Agriculture.

B. Rice Varieties in Arkansas, Leaflet 518, Cooperative Extension Service.

VARIETIES AND SEED SELECTION OF RICE

INFORMATION SHEET

I. Terms and definitions:

A. SEED - A plant embryo and stored food material surrounded by a seed coat.

B. VARIETY - A group of individuals within a species that differ from the rest of the species.

C. BLEND - A mixture of varieties of species.

D. BRAND - A registered trade mark or trade name selected by a company to distinguish and identify the seed it sells.

E. LODGING - The inability of a stem to support the top of the plant resulting in the plant falling over.

F. RESISTANCE - Ability to withstand a disease.

G. CERTIFIED SEED - The bulk of improved seed for sale for commercial growing.

H. FOUNDATION SEED - Highest quality seed that can be purchased.

I. INERT MATTER - The percentage by weight of chaff, broken seeds, stems and soil particles.

II. Six factors to consider in selection of high quality seed.

A. Varietal purity

B. Germination and vigor

C. Mechanical purity and inert matter

D. Weed seed

E. Other crop seed

F. Uniformity

INFORMATION SHEET

III. Six factors to consider in selecting a variety.

   A. Grain
   B. Milling yield potential
   C. Maturity
   D. Straw strength
   E. Resistance to disease
   F. Cooking and processing characteristics

IV. Three grain types of rice.

   A. Long grain
   B. Medium grain
   C. Short grain

V. Three varieties of each grain type. TM 1

   A. Long grain
      1. Starbonnet
      2. Bonnet 73
      3. Lebonnet
   B. Medium grain
      1. Nato
      2. Nova 76
      3. Brazos
   C. Short grain
      1. Nortai
      2. Caloro
      3. Colusa

RICE VARIETIES GROWN IN ARKANSAS IN 1976

Variety	Percent of Acreage[1]
Starbonnet	39.5
Lebonnet	22.9
Nato	13.2
Labelle	7.5
Nova 66, Nova 76	3.3
Bonnet 73	2.6
Nortai	2.0
Brazos	1.8
Others	7.2

[1] The Rice Millers Association Annual Summary

PERFORMANCE OF RECOMMENDED VARIETIES

Grain type and Variety	Relative Grain Yield	Days to 25% Heading	Plant Height	Relative Straw Strength
	(lb/A)	(No.)	(in.)	
Long Grain				
Starbonnet	5210	107	40	2
Bonnet 73	5679	105	41	3
Lebonnet	5361	89	38	3
Labelle	4461	81	38	3
Medium Grain				
Nato	5584	98	44	6
Nova 76	5847	96	41	4
Brazos	6294	88	37	5
Short Grain				
Nortai	6048	102	37	5

REACTION TO DISEASE

Variety	Blast	Sheath Blight	Kernel Smut	Brown Spot
Starbonnet	5	6	6	6
Bonnet 73	6	6	7	4
Lebonnet	2	8	4	4
Labelle	2	8	5	5
Nato	8	5	6	5
Nova 76	4	5	4	5
Brazos	8	7	3	6
Nortai	4	5	1	6

Degrees of Susceptibility

1 = least susceptibility

9 = most susceptibility

VARIETIES AND SEED SELECTION OF RICE

ASSIGNMENT SHEET #1 - SURVEY FOR VARIETIES AND SEED SELECTION

Survey ten rice growers in the student's area. Find out what varieties each grows and reasons why these were selected.

Varieties Grown	Reasons for growing
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	

VARIETIES AND SEED SELECTION OF RICE

ANSWERS TO ASSIGNMENT SHEET

Assignment sheet #1

To the satisfaction of the instructor.

VARIETIES AND SEED SELECTION OF RICE

TEST

I. Match terms associated with rice varieties and seed selection.

A. Seed

B. Variety

C. Blend

D. Brand

E. Lodging

F. Resistance

G. Certified seed

H. Foundation seed

I. Inert matter

___1. A registered trade mark or trade name selected by a company to distinguish and identify the seed it sells.

___2. A plant embryo and stored food material surrounded by a seed coat.

___3. The bulk of improved seed for sale for commercial growing.

___4. A mixture of varieties of species.

___5. Highest quality of seed that can be purchased.

___6. The inability of a stem to support the top of the plant resulting in the plant falling over.

___7. Ability to withstand a disease.

___8. A group of individuals within a species that differ from the rest of the species.

___9. The percentage by weight of chaff, broken seeds, stems and soil particles.

II. List six factors to consider in selection of high quality seed.

A.

B.

C.

D.

E.

F.

III. List six factors to consider in selecting a variety.

A.

B.

C.

D.

E.

F.

IV. List three grain types of rice.

A.

B.

C.

V. List three varieties of each type.

A.

B.

C.

VARIETIES AND SEED SELECTION OF RICE

ANSWERS TO TEST

I. 1. D
2. A
3. G
4. C
5. H
6. E
7. F
8. B
9. I

II. A. Varietal purity
B. Germination and vigor
C. Mechanical purity and inert matter
D. Weed seed
E. Other crop seed
F. Uniformity

III. A. Grain
B. Milling yield potential
C. Maturity
D. Straw strength
E. Resistance to disease
F. Cooking and processing characteristics

IV. A. Long grain
B. Medium grain
C. Short grain

V.

1. Starbonnet
2. Bonnet 73
3. Lebonnet

1. Nato
2. Nova 76
3. Brazos

1. Nortai
2. Caloro
3. Colusa

SECTION B

UNIT II

PLANTING OF RICE

PLANTING OF RICE

TERMINAL OBJECTIVE

After completion of this unit, the student should be able to discuss the recommended practices of planting rice. This knowledge will be evidenced by scoring at least eighty-five percent on the unit test.

SPECIFIC OBJECTIVES

After completion of this unit, the student should be able to:

I. Match terms associated with planting of rice to correct definition.

II. List five factors to consider when buying planting seed.

III. List two sources of seed.

IV. Discuss in a short paragraph the factors to consider on when to plant rice.

V. List three facts about planting rates.

VI. List three methods of planting.

VII. List three advantages of drilling.

VIII. List two advantages of broadcasting on dry land.

IX. Discuss in a paragraph the steps involved in planting on water.

X. List two factors to consider in deciding on planting depth.

PLANTING OF RICE

SUGGESTED ACTIVITIES

I. Instructor:

  A. Provide students with objective sheet.

  B. Provide students with information sheet.

  C. Prepare transparencies.

  D. Discuss terminal objectives.

  E. Discuss information sheets and assignment sheets.

  F. Take field trip.

  G. Give test.

  H. Retest if necessary.

II. Students:

  A. Read objective sheet.

  B. Study information sheets.

  C. Demonstrate the ability to accomplish the procedure outlined in the assignment sheet.

  D. Take test.

  E. Retest if necessary.

INSTRUCTIONAL MATERIALS

I. Included in this unit:

  A. Objectives

  B. Information sheets

  C. Transparency masters

    1. TM 1 - Seed Dates for Rice Varieties

    2. TM 2 - Number of Seed per Square Foot at Indicated Rates

D. Assignment sheet

    1. Assignment sheet #1 - Methods of Planting Rice

E. Answers to assignment sheet

F. Test

G. Answers to test

II. References:

A. Rice in the United States; Varieties and Production, Handbook No. 289, Agricultural Research Service, U.S. Department of Agriculture.

B. Leaflet 518, Rice Varieties in Arkansas.

PLANTING OF RICE

INFORMATION SHEET

I. Terms and definitions:

A. SEEDBED - The soil in which seed is placed to germinate.

B. SOIL PRODUCTIVITY - The ability of the soil to produce.

C. HARDPAN - A compact layer below the plow soil.

D. CROP RESIDUE - The remains of the pervious years crop.

E. SOIL FERTILITY - The supply of plant nutrients present in the soil.

F. CULTIPACKER - A piece of farm equipment used to smooth and make firm seedbeds on rough, cloddy land.

G. CHLORISIS - The yellowing or blanching of leaves and other chlorophyll bearing plant parts.

H. RED RICE - A plant which belongs to the same species as cultivated rice but is considered a weed in the United States.

II. Five factors to consider when buying planting seed.

A. Free of varietal mixtures

B. Does not contain red rice

C. High percentage of viable seed

D. High bushel weight

E. Free of inert matter

III. Two sources of seed:

A. Seed dealers

B. Local seed producers

IV. Factors to consider on when to plant rice.

A. Temperature averages 70^{o}F in spring

INFORMATION SHEET

B. Seeding too early may result in:

   1. Failure to obtain effective weed control
   2. Damage from seedling diseases
   3. Chlorosis due to high ph soils
   4. Severe bird damage to first fields to head in fall
   5. Likelihood of lower quality of grain which matures during extremely hot weather

C. Seeding too late may result in:

   1. Reduced seed set
   2. Grains not filling out properly due to low fall temperatures.

V. Three facts about planting rates.

   A. 90 to 100 lbs. per acre drilled

   B. 110 to 150 lbs. broadcast

   C. Need 15 to 20 seedlings per square foot

VI. Methods of planting.

   A. Drilling

   B. Broadcast by endgate seeder on dry land

   C. Broadcast on water with airplane

VII. Three advantages of drilling.

   A. Less seed required

   B. Plant at uniform depth and rates

   C. More uniform stand

VIII. Advantages of broadcasting on dry land.

   A. Less machinery needed

   B. Easier on new rice land

INFORMATION SHEET

IX. Steps in water planting.

- A. Leave seedbed rough to prevent drifting of seed
- B. Sow immediately after flooding
- C. Flood to a depth of 4 to 6 inches
- D. Construct levees before flooding
- E. Airplane guided by flagmen
- F. Drain field in about five weeks to control water rice weevil and prevent striaghthead.

X. Planting depth.

- A. 1 to 2 inches recommended planting depth
- B. Deeper planting results in poor stands

RECOMMENDED RICE VARIETIES AND SUGGESTED SEEDING DATES FOR ARKANSAS

	Planting Dates[1]		
Variety	Beginning	Optimum	Cut-Off
Starbonnet	April 10	April 20-May 5	May 20
Bonnet 73	April 10	April 20-May 5	May 20
Lebonnet	May 1	May 10-May 20	June 15
Labelle	May 10	May 20-May 30	June 20
Nova 76	April 20	April 25-May 10	June 10
Nato	April 20	April 25-May 10	May 30
Brazos	May 1	May 5-May 15	June 10
Nortai	April 15	April 25-May 5	May 30

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[1] Dates are based on available information and are to be used only as guides. Adjustments of up to 10 days may be needed for location in northern Arkansas.

ESTIMATED NUMBER OF SEED PER SQUARE FOOT

AT INDICATED SEED RATES

Variety	90	120	150
Starbonnet	45	60	75
Bonnet 73	45	60	75
Lebonnet	36	47	59
Labelle	43	57	71
Nato	41	54	68
Nova 76	34	45	57
Brazos	33	44	56
Nortai	36	48	59

RP - 33-B

PLANTING OF RICE

ASSIGNMENT SHEET #1

Planting Methods:

The student is to survey ten rice farmers in his area for methods of planting and reasons for using this method.

METHOD	REASONS
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	

PLANTING OF RICE

ANSWERS TO ASSIGNMENT SHEET #1

Answer to the satisfaction of the instructor.

PLANTING OF RICE

TEST

I. Match terms listed below with the correct definition.

A. Seedbed

B. Soil Productivity

C. Hardpan

D. Crop Residue

E. Soil Fertility

F. Cultipacker

G. Chlorosis

H. Red Rice

___1. The supply of plant nutrients present on the soil.

___2. The soil in which seed is placed to germinate.

___3. A compact layer below the plow soil.

___4. A plant which belongs to the same species as cultivated rice but is considered a weed in the United States.

___5. A piece of farm equipment used to smooth and make firm seedbeds on rough, cloddy land.

___6. The yellowing or blanching of leaves and other chlorophyll bearing plant parts.

___7. The remains of the previous years crop.

___8. The ability of the soil to produce.

II. List five factors to consider when buying planting seed.

A.

B.

C.

D.

E.

III. List two seed sources.

A.

B.

IV. Discuss in a short paragraph the factors to consider on when to plant rice.

V. List three facts about planting rates.

A.

B.

C.

VI. List three methods of planting.

A.

B.

C.

VII. List three advantages of drilling.

A.

B.

C.

VIII. List two advantages of broadcasting on dry land.

A.

B.

IX. Discuss in a paragraph the steps involved in planting on water.

X. List two factors to consider in deciding on planting depth.

A.

B.

PLANTING OF RICE

ANSWERS TO TEST

I.
1. E
2. A
3. C
4. H
5. F
6. G
7. D
8. B

II.
- A. Free of varietal mixtures
- B. Does not contain red rice
- C. High percentage of viable seed
- D. High bushel weight
- E. Free of inert matter

III.
- A. Seed dealers
- B. Local seed producers

IV. Paragraph should include:

- A. Temperatures average 70°F in spring.
- B. Seeding too early may result in:
  1. Failure to obtain effective weed control.
  2. Damage from seedling diseases.
  3. Chlorosis due to high ph soils.
  4. Severe bird damage to first fields to head in fall.
  5. Likelihood of lower quality of grain which matures during extremely hot weather.

C. Seeding too late may result in:

1. Reduced seed set

2. Grains not filling out properly due to low fall temperatures.

V. A. 90 to 100 lbs. per acre drilled

B. 110 to 150 lbs. broadcast

C. Need 15 to 20 seedlings per square foot

VI. Methods of planting.

A. Drilling

B. Broadcast by endgate seeder on dry land

C. Broadcast on water with airplane

VII. A. Less seed required

B. Plant at uniform depth and rates

C. More uniform stand

VIII. A. Less machinery needed

B. Easier on new rice land

IX. Paragraph should include:

A. Leave seedbed rough to prevent drifting of seed

B. Sow immediately after flooding

C. Flood to a depth of 4 to 6 inches

D. Construct levees before flooding

E. Airplane guided by flagmen

F. Drain field in about five weeks to control water rice weevil and prevent straighthead.

X. A. 1 to 2 inches recommended planting depth

B. Deeper planting results in poor stands

SECTION B

UNIT III

GROWTH STAGES OF THE RICE PLANT

GROWTH STAGES OF THE RICE PLANT

TERMINAL OBJECTIVE

After completion of this unit, the student should be able to discuss the processes involved in the growth stages of the rice plant. This knowledge will be evidenced by scoring at least eighty-five percent on the unit test.

SPECIFIC OBJECTIVES

After completion of this unit, the student should be able to:

I. Match terms associated with growth stages of the rice plant to the correct definition.

II. Name the four principle parts of the rice plant.

III. Pick from a list the two stages of growth.

IV. List three parts of the vegetative stage.

V. List ten parts of the reproductive stage.

VI. Discuss in a short paragraph the root development of the rice plant.

VII. List five factors that determine the number of tillers.

VIII. Discuss in a short paragraph the change to the reproductive stage in the rice plant.

IX. List four facts about Panicle development of the rice plant.

X. List five causes of failure of rice to set seed.

GROWTH STAGES OF THE RICE PLANT

SUGGESTED ACTIVITIES

I. Instructor:

- A. Provide students with objective sheet.
- B. Provide students with information sheet.
- C. Make transparencies.
- D. Discuss terminal and specific objectives.
- E. Discuss information sheets.
- F. Take field trip.
- G. Give test.

II. Students

- A. Read objectives
- B. Study information sheets
- C. Take test

INSTRUCTIONAL MATERIALS

I. A. Objectives

- B. Information sheets
- C. Transparency masters
  1. TM 1 - Stages of Growth of Rice
  2. TM 2 - Period of Development (days)
  3. TM 3 - Parts of Primary Tiller
  4. TM 4 - Parts of a Panicle
- D. Test
- E. Answers to test

II. References:

A. Rice In The United States; Varieties And Production, Agriculture Handbook No. 289, Agricultural Research Service, U.S. Department of Agriculture.

B. Circular 476, Rice Production In Arkansas.

GROWTH STAGES OF THE RICE PLANT

INFORMATION SHEET

I. Terms and definitions:

A. PANICLE - Commonly called the head.

B. FLORET - One flower.

C. STAMEN - Male flower part which bears pollen, the rice flower has six stamens.

D. STIGMA - Female flower part which receives the pollen.

E. JOINTING - The time when the nodes, internodes and panicle are being differentiated and developed.

F. TILLERING - Refers to the branching or stooling of the plant.

G. BOOT - The upper leaf sheath of rice.

H. BOOTING STAGE - The stage at which the head expands the boot.

I. SPIKLET - One flower which develops a single seed.

J. ANTHESIS - Flowering.

K. INTERNODE - The part of the stem between two nodes.

L. NODE - A joint of a stem where a leaf is attached.

II. Principle parts of the rice plant.

A. Fibrous root system

B. Culms

C. Leaves

D. Panicles

III. Periods of growth.

A. Vegatative

B. Reproductive

INFORMATION SHEET

IV. Parts of the vegatative stage.

  A. Germination

  B. Seedling establishment

  C. Tillering

V. Parts of the reproductive stage.

  A. Panicle (Head) initiation

  B. Jointing

  C. Head development

  D. Booting

  E. Heading

  F. Flowering

  G. Pollination

  H. Grain development

  I. Ripening

  J. Maturity

VI. Root development of the rice plant.

  A. Begins with germination

  B. Roots extend outward and down

  C. Temperature, oxygen & moisture effect root development.

VII. Factors that determine the number of tillers.

  A. Soil fertility

  B. Variety

  C. Plant stand

  D. Competition

  E. Two or three tillers per plant normal

INFORMATION SHEET

VIII. Changes to the reproductive stage in the rice plant.

- A. Change brought on by:
    - 1. Day length
    - 2. Light intensity
    - 3. High temperature
- B. Starts with head formation
- C. Continues until maturity

IX. Panicle development of the rice plant.

- A. Begins 3 to 4 weeks before heads are visible in field.
- B. Each head is composed of spiklets.
- C. Blooming begins same as head emerges.
- D. Blooming starts at top of head and goes downward for a period of 6 to 10 days.

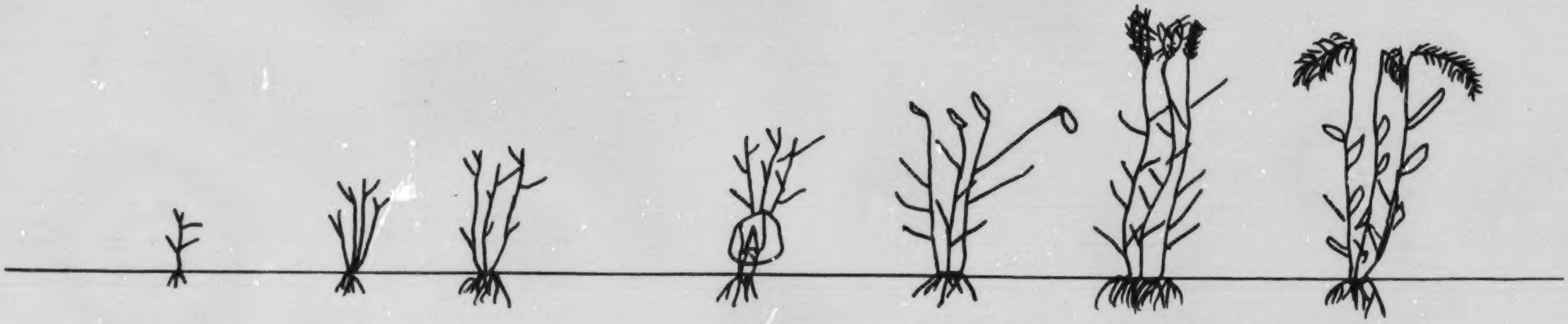
X. Causes of failure of rice to set seed.

- A. Mechanically damaged by blackbirds.
- B. Rain and windstorms at time of blooming.
- C. Insect damage.
- D. Low night time temperature.
- E. Low amount of nutrients available.

RP - 51-B

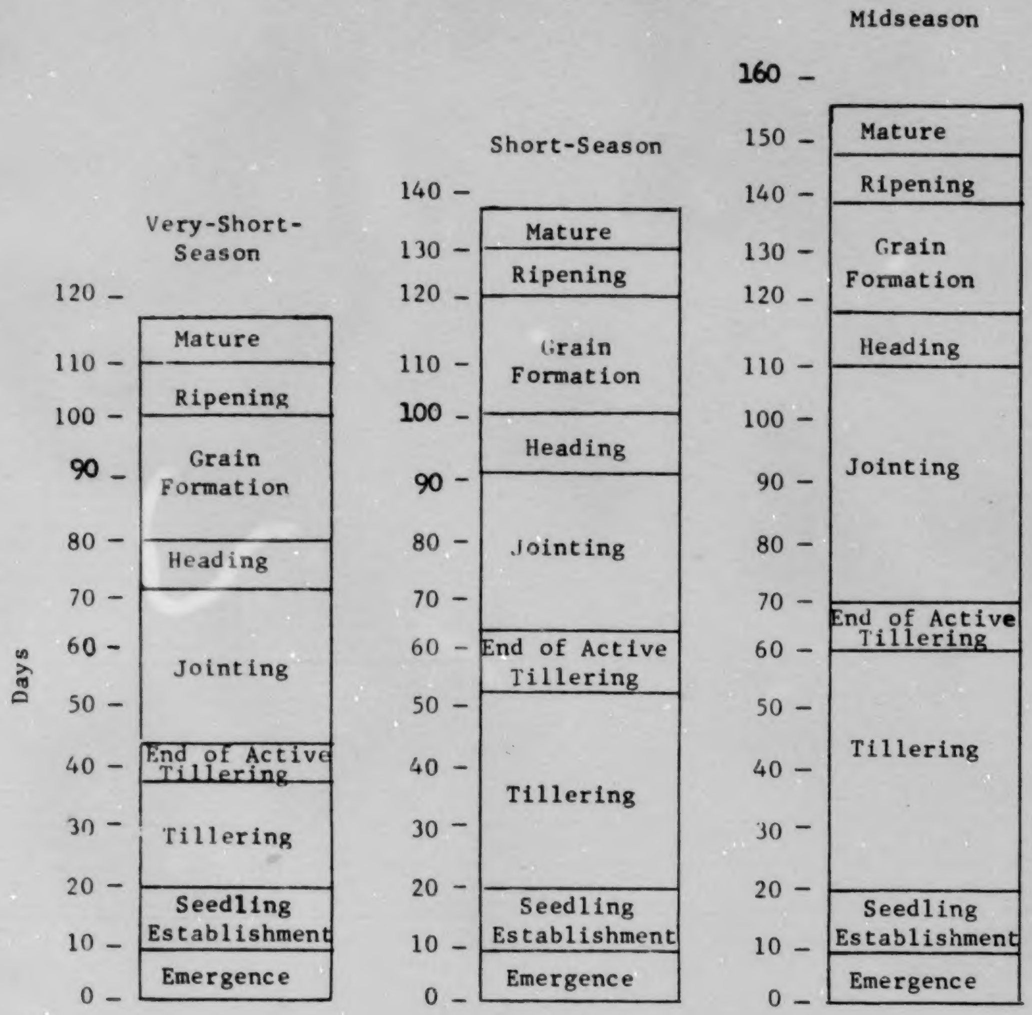
TM 1

STAGES OF GROWTH

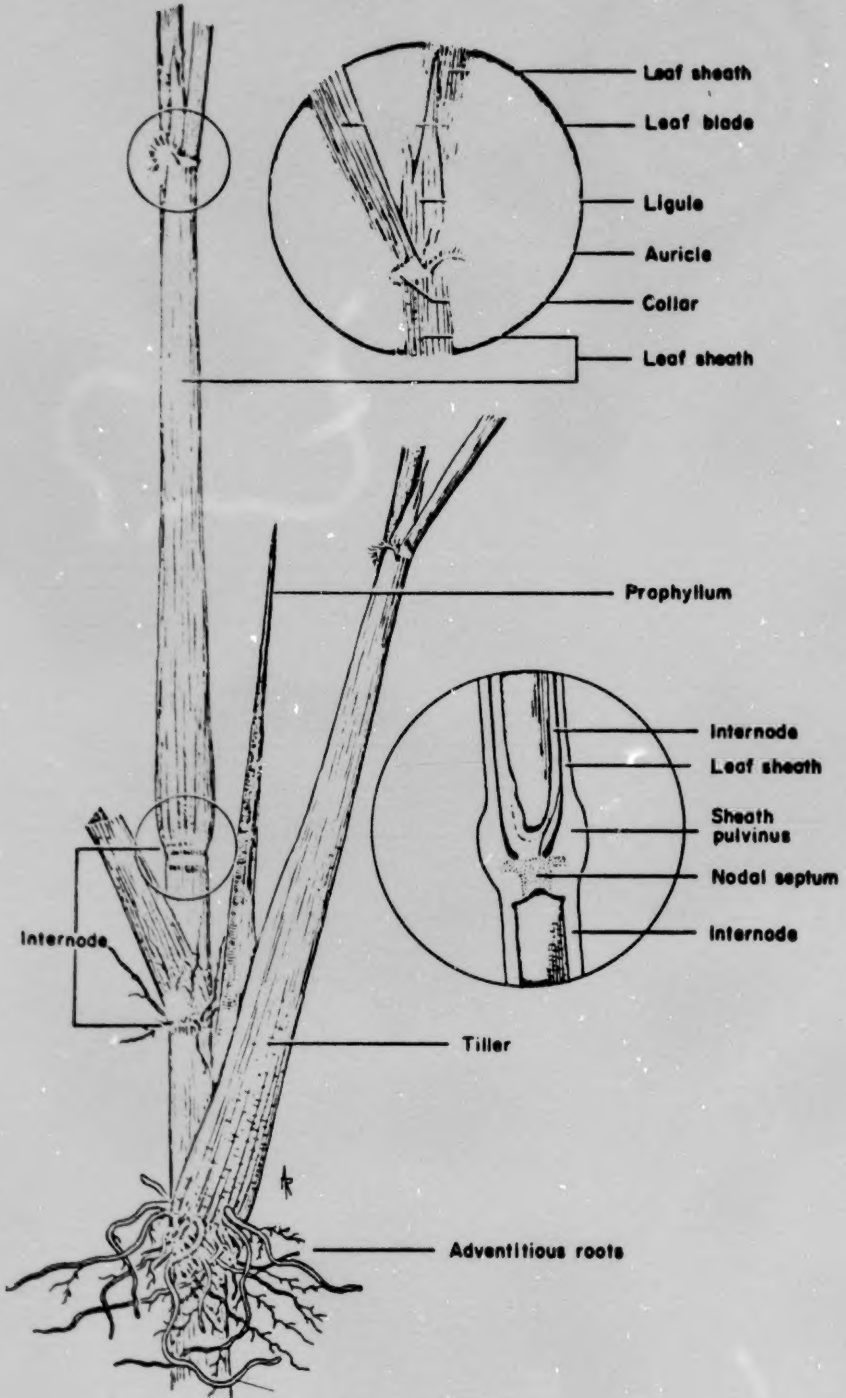

Seedling
Early Tillering
Late Tillering
Panicle Initiation
Booting
Heading
Maturity
VEGATATIVE
REPRODUCTIVE

Stages of Development of Rice Varieties in Arkansas*

Period of Development (Days)



PARTS OF PRIMARY TILLER


Leaf sheath
Leaf blade
Ligule
Auricle
Collar
Leaf sheath
Prophyllum
Internode
Leaf sheath
Sheath pulvinus
Nodal septum
Internode
Internode
Tiller
Adventitious roots
AR

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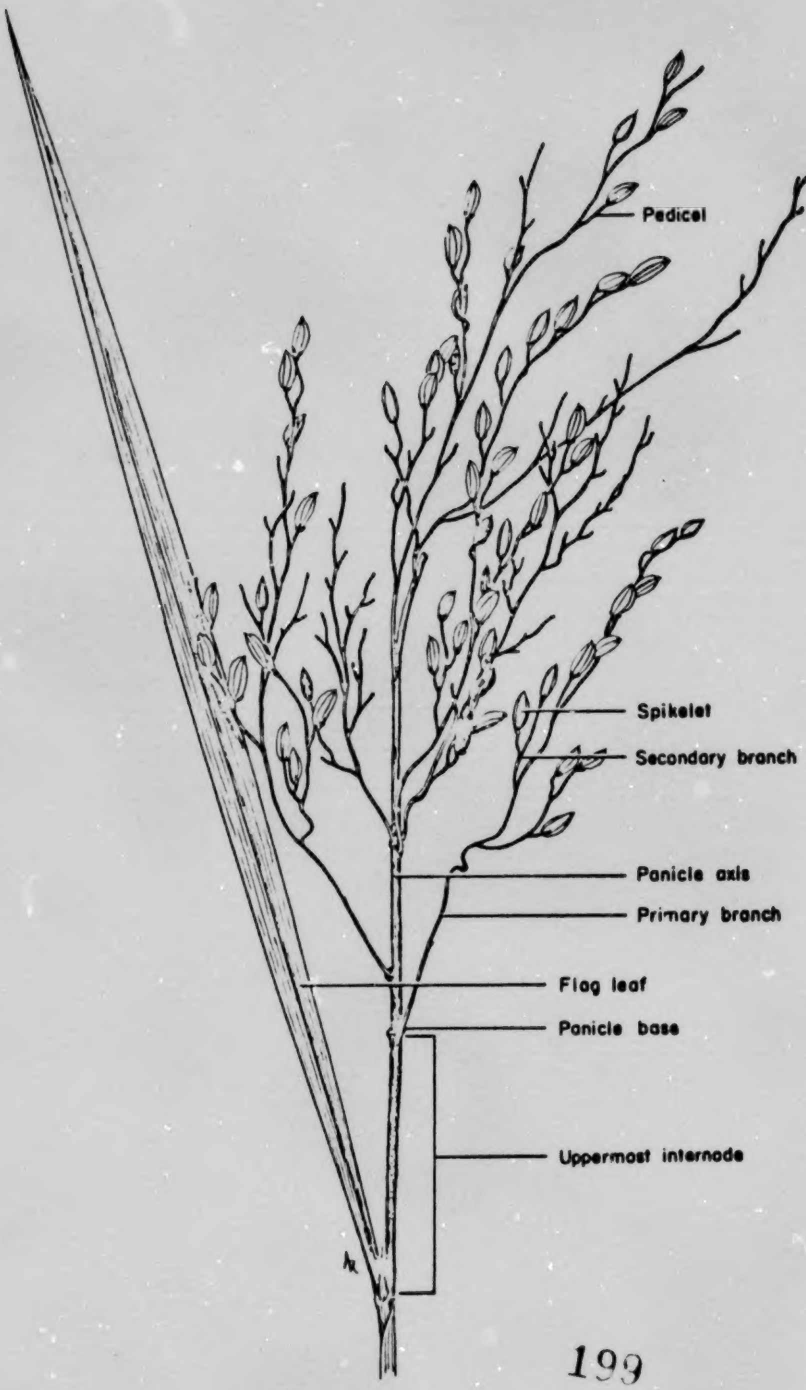
Parts of a primary tiller and its secondary tiller.

Picture from The Morphology and Varietal Characteristics of the Rice Plant by Te-Tzu Chang and Eliseo A. Bardenas, Technical Bulletin 4, The International Rice Research Institute.

PARTS OF A PANICLE


Pedicel
Spikelet
Secondary branch
Panicle axis
Primary branch
Flag leaf
Panicle base
Uppermost internode

Component parts of a panicle (partly shown in this illustration).

Picture from The Morphology and Varietal Characteristics of the Rice Plant by Te-Tzu Chang and Eliseo A. Bardenas, Technical Bulletin 4, The International Rice Research Institute.

GROWTH STAGES OF THE RICE PLANT

TEST

I. Match terms associated with growth stages of the rice plant to the correct definition.

___A. Commonly called the head.

___B. One flower.

___C. Male flower part which bears pollen, the rice flower has six stamens.

___D. Female flower part which receives the pollen.

___E. The time when nodes, internodes and panicle are being differentiated and developed.

___F. Refers to the branching or stooling of the plant.

___G. The upper leaf sheath of rice.

___H. The stage at which the head expands the boot.

___I. One flower which develops a single head.

___J. Flowering.

___K. The part of the stem between two nodes.

___L. A joint of a stem where a leaf is attached.

1. Floret
2. Internode
3. Node
4. Panicle
5. Tillering
6. Anthesis
7. Boot
8. Jointing
9. Spiklet
10. Booting Stage
11. Stigma
12. Stamen

II. Name the four principle parts of the rice plant.

A.

B.

C.

D.

III. Pick from a list the two stages of growth of the rice plant, by placing an "X" in the appropriate blank.

___A. Jointing

___B. Vegatative

___C. Reproductive

___D. Booting Stage

IV. List three parts of the vegatative stage.

A.

B..

C.

V. List ten parts of the reproductive stage.

A.

B.

C.

D.

E.

F.

G.

H.

I.

J.

VI. Discuss in a short paragraph the root system development of the rice plant.

VII. List five factors that determine the number of tillers.

A.

B.

C.

D.

E.

VIII. Discuss in a short paragraph the change to the reproductive stage in the rice plant.

IX. List four facts about panicle development of the rice plant.

A.

B.

C.

D.

X. List five causes of failure of rice to set seed.

A.

B.

C.

D.

E.

GROWTH STAGES OF THE RICE PLANT

ANSWERS TO TEST

I. A. 4
B. 1
C. 12
D. 11
E. 8
F. 5
G. 7
H. 10
I. 9
J. 6
K. 2
L. 3

II. A. Fibrous root system
B. Culms
C. Leaves
D. Panicles

III. An "X" should be in blank B and C.

IV. A. Germination
B. Seedling establishment
C. Tillering

V. A. Panicle initiation
B. Jointing
C. Head development
D. Booting

E. Heading

F. Flowering

G. Pollination

H. Grain development

I. Ripening

J. Maturity

VI. Paragraph should include:

A. Begins with germination

B. Roots extend outward and down

C. Temperature, oxygen and moisture effect root development.

VII. A. Soil fertility

B. Variety

C. Plant stand

D. Competition

E. Two or three tillers per plant normal

VIII. Paragraph should include:

A. Change brought on by:

1. Day length

2. Light intensity

3. High temperature

B. Starts with head formation

C. Continues until maturity

IX. A. Begins 3 to 4 weeks before heads are visible in field.

B. Each head is composed of spiklets.

C. Blooming begins same as head emerges.

D. Blooming starts at top of head and goes downward for a period of 6 to 10 days.

X. A. Mechanically damaged by blackbirds.
   B. Rain and windstorms at time of blooming.
   C. Insect damage.
   D. Low night time temperature.
   E. Low amount of nutrients available.

SECTION B

UNIT IV

FERTILIZATION OF RICE

FERTILIZATION OF RICE

TERMINAL OBJECTIVE

After completion of this unit, the student should be able to discuss types of fertilizers and recommendations for applying this fertilizer to rice. This knowledge will be evidenced by scoring at least eighty-five percent on the unit test.

SPECIFIC OBJECTIVES

After completion of this unit, the student should be able to:

I. Match terms associated with fertilization of rice to the correct definition.

II. List three major nutrients required for rice.

III. List three ways the rice uses nitrogen.

IV. Discuss in a short paragraph, the timing of nitrogen applications for rice.

V. List three times nitrogen is applied to rice and two types used at each of these times.

VI. Discuss in a short paragraph, precautions to follow when using nitrogen fertilizer on rice.

VII. List four facts on phosphate fertilization of rice.

VIII. List five facts about potassium fertilization of rice.

IX. Pick from a list, the two micronutrients usually needed in rice fertilization.

X. List two ways to determine soil needs for rice production.

XI. List two types of problem soils.

XII. Discuss in a short paragraph, calcareous soils.

FERTILIZATION OF RICE

SUGGESTED ACTIVITIES

I. Instructor:

   A. Provide students with objective sheet.

   B. Provide students with assignment and information sheets.

   C. Make transparencies.

   D. Discuss terminal and specific objectives.

   E. Discuss assignment and information sheets.

   F. Take field trip.

   G. Give test.

II. Students:

   A. Read objective sheet

   B. Study information sheets

   C. Participate in field trip

   D. Take test

INSTRUCTIONAL MATERIALS

I. Included in this unit:

   A. Objectives

   B. Information sheets

   C. Transparency masters

      1. TM 1 - Major Nutrients

      2. TM 2 - Guide For Rate and Timing of Nitrogen

   D. Test

   E. Answers to test

II. References:

A. Leaflet 405, Nitrogen Fertilization of Rice in Arkansas, Cooperative Extension Service, University of Arkansas, Division of Agriculture and U.S. Department of Agriculture Cooperating.

B. Circular 476, Rice Production In Arkansas.

FERTILIZATION OF RICE

INFORMATION SHEET

I. Terms and definitions:

A. FERTILIZER - Any natural, manufactured or processed mixture that contains one or more of the recognized plant food elements either liquid or dry.

B. PH - A term used to indicate the degree of acidity or alkalinity of the soil.

C. TISSUE TEST - Test ran on plant tissue to determine plant food needs of the crop.

D. CALCAREOUS SOILS - Soil high in lime with a ph of 7.0 or more.

E. UREA - A form of nitrogen fertilizer.

F. CELLULOSE - Primary cell-wall substance.

G. SALINE SOIL - Salty condition caused by the presence of soils other than calcium and magnesium.

II. Major nutrients required for rice.

A. Nitrogen

B. Phosphate

C. Potash

III. Three ways the rice uses nitrogen.

A. Large amounts of nitrogen required by rice.

B. Need for tillering.

C. Need for head development.

IV. Timing of nitrogen applications for rice.

A. Early season nitrogen application.

1. To increase tillering

2. Initiate sufficient florets per head for high yields

3. 60 lbs. per acre or more required at this point.

INFORMATION SHEET

B. Midseason nitrogen application.

1. After plant begins reproductive phase.

2. Need at this time for grain development.

3. Should be applied in two increment.

a. When internode are at correct length for the variety.

b. 10-14 days later.

V. Nitrogen sources.

A. Preplant

1. Ammonium sulfate

2. Anhydrous ammonia

B. Pre-flood

1. Urea

2. Ammonium sulfate

C. Mid season

1. Ammonium sulfate

2. Ammonium nitrate

VI.. Precautions to follow when using nitrogen fertilizer.

A. Apply to rice plant when needed,too much nitrogen may result in:

1. Excessive vegetative growth

2. Increased lodging

3. Disease damage

4. Reduce grain yields

B. Excessive nitrogen late in season may result in sterility.

C. Urea applied to wet but not flooded soils when temperature is high may volatize.

INFORMATION SHEET

VII. Phosphate fertilization of rice.

- A. Essential for optimum yield.
- B. Requirements small compare to nitrogen.
- C. Direct application do not result in increased yields.
- D. Requirements are usually met by phosphate in the soil.

VIII. Potassium fertilization of rice.

- A. Develops plants resistance to lodging.
- B. Necessary for development of lignin and cellulose in plant stem.
- C. Helps manufacturer and transports food.
- D. Production of 100 bushels of rice removes only 18 to 20 lbs. of potassium from soil.
- E. Response to potash application low.

IX. Micronutrients usually needed in rice fertilization.

- A. Iron
- B. Zinc

X. Two ways to determine soil needs.

- A. Soil test
- B. Tissue test

XI. Two types of problem soils.

- A. Calcareous soil
- B. Saline condition

XII. Calcareous soil.

- A. Result of using irrigation water containing large amounts of calcium and magnesium carbonate.

INFORMATION SHEET

B. Ph ranges from 7.0 to 8.0.

C. Very little available iron.

D. May be acidified by:

   1. Change in water
   2. Crop rotation
   3. Adding a acid such as sulfuric

RP - 75-B

MAJOR (PRIMARY) NUTRIENTS

NITROGEN N

PHOSPHORUS P

POTASSIUM K

FERTILIZATION OF RICE

GUIDE FOR RATE AND TIMING OF NITROGEN

VARIETY	N RATES 1/		TIMING	N DISTRIBUTION ACCORDING TO TOTAL RATE			
						MIDSEASON	
	"OLD" SOILS	"NEW" SOILS	CORRECT INTERNODE LENGTH 2/	TOTAL RATE TO BE APPLIED 3/	EARLY PREPLANT OR 15 Days 4/	INTER-NODE 5/	INTERNODE PLUS 10 to 14 DAYS 6/
	-------(lb/A)-----		--(in)--	-------------------(lb/A)-------------------			
Starbonnet	110-130	80-110	1/2	60	30	30	0
Bonnet 73 7/	90-110	70-100	1 1/2	70	35	35	0
Lebonnet	90-110	70-100	3/4	80	40	40	0
Labelle	110-130	80-110	3/4	90	40	25	25
Nato	70-100	60- 80	1 1/2	100	50	25	25
Nova 76	70-100	60- 80	1 1/2	110	50	30	30
Brazos	110-130	80-110	1/2	120	60	30	30
Nortal	110-130	80-110	1/2	130	60	35	35

1/ "Old" soils are those with long history of field crops, and "new" soils have history of less than 5 years of crop production.

2/ Designated length for 50% of the 1st elongating internodes for timing the 1st midseason nitrogen application.

3/ Rates in this column cover the range of nitrogen rates. Distribution for any variety depends on the total nitrogen rate selected from column 2 or 3.

4/ Lb/A of nitrogen to apply either preplant incorporated or on dry soil 15 days after emergence just prior to flooding.

5/ Lb/A of nitrogen to apply when DD 50 values or internode lengths are correct for the specific variety.

6/ Lb/A of nitrogen to apply 10 to 14 days after correct DD 50 value or internode length occurs.

7/ For Bonnet 73, apply all nitrogen preplant except on clay soils. On clay soils apply 70% at 15 days and 30% at 1½-inch internode.

FERTILIZATION OF RICE

TEST

I. Match the terms listed below to the correct definition.

___A. Fertilizer

___B. Saline Soil

___C. Ph

___D. Tissue Test

___E. Cellulose

___F. Calcareous soils

___G. Urea

1. Any natural, manufactured or processed mixture that contains one or more of the recognized plant food elements.
2. A term used to indicate the degree of acidity or alkalinity of the soil.
3. Test ran on plant tissue to determine plant food needs of crop.
4. Soil high in lime with a ph of 7.0 or more.
5. A form of nitrogen fertilizer.
6. Primary cell-wall substance.
7. Salty condition caused by the presence of soils other than calcium and magnesium.

II. List three major nutrients required for rice.

A.

B.

C.

III. List three ways the rice plant used nitrogen.

A.

B.

C.

IV. Discuss in a short paragraph, the timing of nitrogen applications for rice.

V. List three times nitrogen is applied to rice and two types used at each of these times.

A.

   1.

   2.

B.

   1.

   2.

C.

   1.

   2.

VI. Discuss in a short paragraph, precautions to follow when using nitrogen fertilizer on rice.

VII. List four facts on phosphate fertilization of rice.

A.

B.

C.

D.

VIII. List five facts about potassium fertilization of rice.

A.

B.

C.

D.

E.

IX. Pick from a list the two micronutrients usually needed in rice fertilization.

___A. Iron ___C. Zinc

___B. Silver ___D. Copper

X. List two ways to determine soil needs for rice produciton.

A.

B.

XI. List two types of problem soils.

A.

B.

XII. Discuss in a short paragraph, calcareous soils.

FERTILIZATION OF RICE

ANSWERS TO TEST

I. A. 1
   B. 7
   C. 2
   D. 3
   E. 6
   F. 4
   G. 5

II. A. Nitrogen
    B. Phosphate
    C. Potash

III. A. Large amounts of nitrogen required by rice.
     B. Need for tillering.
     C. Need for head development.

IV. Paragraph should include:

- A. Early season nitrogen application.
  - 1. To increase tillering.
  - 2. Initiate sufficient florets per head for high yields.
  - 3. 60 lbs. per acre or more required at this point.
- B. Midseason nitrogen application.
  - 1. After plant begins reproductive phase.
  - 2. Need at this time for grain development.
  - 3. Should be applied in two increment.
    - a. When internode are at correct length for the variety.

- b. 10-14 days later

V. A. Preplant

- 1. Ammonium sulfate
- 2. Anhydrous ammonia

B. Pre-flood

- 1. Urea
- 2. Ammonium sulfate

C. Mid season

- 1. Ammonium sulfate
- 2. Ammonium nitrate

VI. Paragraph should include:

A. Apply to rice plant when needed, too much nitrogen may result in:

- 1. Excessive vegetative growth
- 2. Increased lodging
- 3. Disease damage
- 4. Reduce grain yields

B. Excessive nitrogen late in season may result in sterility.

C. Urea applied to wet but not flooded soils when temperature is high may volatize.

VII. A. Essential for optimum yield.

B. Requirements small compare to nitrogen.

C. Direct application do not result in increase yields.

D. Requirements are usually met by phosphate in the soil.

VIII. A. Develops plants resistance to lodging.

B. Necessary for development of lignin and cellulose in plant stem.

C. Helps manufacturer and transports food.

D. Production of 100 bushels of rice removes only 18 to 20 lbs. of potassium from soil.

E. Response to potash application low.

IX. An "X" should be placed in blanks A and C.

X. A. Soil test

B. Tissue test

XI. A. Calcareous soil

B. Saline condition

XII. Paragraph should include:

A. Result of using irrigation water containing large amounts of calcium and magnesium carbonate.

B. Ph ranges from 7.0 to 8.0.

C. Very little available iron.

D. May be acidified by:

1. Change in water
2. Crop rotation
3. Adding a acid such as sulfuric

SECTION B

UNIT V

WEED CONTROL

WEED CONTROL

TERMINAL OBJECTIVE

After completion of this unit, the student should be able to discuss the recommended weed control practices for rice production. This knowledge will be evidenced by scoring at least eighty-five percent on the unit test.

SPECIFIC OBJECTIVES

After completion of this unit, the student should be able to:

I. Match terms associated with weed control in rice to the correct definition.

II. List six ways weeds interfere with rice production.

III. List six preventative measures for weed control.

IV. List six cultural practices used in weed control.

V. Name three classes of weeds.

VI. List ten problem weeds from grasslike and aquatic weeds.

VII. Name four recommended chemicals for control of weeds.

VIII. Name four advantages of early weed control.

IX. Discuss in a short paragraph, what weeds cost the farmer each year.

X. Name five factors influencing the competative effects of specific weeds.

WEED CONTROL

SUGGESTED ACTIVITIES

I. Instructor:

  A. Provide students with objective sheet.

  B. Provide students with information sheets.

  C. Prepare transparencies.

  D. Discuss terminal and specific objectives.

  E. Discuss information and assignment sheets.

  F. Take field trip.

  G. Give test.

II. Students:

  A. Read objective sheet.

  B. Study information sheet.

  C. Demonstrate the ability to accomplish the procedure outlined in the assignment sheet.

  D. Take test.

INSTRUCTIONAL MATERIALS

I. Included in this unit:

  A. Objectives

  B. Information sheets

  C. Transparency masters

    1. TM 1 - Grasslike Weed Control In Rice

    2. TM 2 - Aquatic Broadleaf Weed Control In Rice

  D. Assignment sheets

    1. Assignment sheet #1 - Problem Weed of Rice

E. Answers to assignment sheets

F. Test

G. Answers to test

II. References:

A. Rice In The United States; Varieties and Production, Agricultural Handbook No. 289, Agricultural Research Service, U.S. Department of Agriculture.

B. Broadleaf and Aquatic Weed Control In Rice, Leaflet 469, Cooperative Extension Service, University of Arkansas, Division of Agriculture and U.S. Department of Agriculture, Cooperating.

C. Weed Control in Rice, Leaflet 485.

D. Control of Grass and Grasslike Weeds In Rice, Leaflet 485, Cooperative Extension Service, University of Arkansas, Division of Agriculture and U.S. Department of Agriculture, Cooperating.

WEED CONTROL

INFORMATION SHEET

I. Terms and definitions:

   A. CULTURAL PRACTICES - Mechanical control of weeds.

   B. WEED - Any undesirable plant or a plant growing where it is not wanted.

   C. NOXIOUS - A plant which for one or more reasons is especially undesirable.

   D. ERADICATION - Complete removal of a weed.

   E. PREVENTATIVE - Keeping weeds from getting started.

   F. HERBICIDE - Chemical weed killer.

   G. AQUATIC - Refers to growing in water.

   H. ALGAE - One celled plant growing in water.

II. Six ways weeds interfere with rice production.

   A. Compete for water

   B. Compete for nutrients

   C. Compete for light

   D. Reduce yields

   E. Increase cost of harvesting, drying and cleaning

   F. Reduces market value

III. Six preventative measures for weed control.

   A. Use weed free sand

   B. Use irrigation water free of weed seed

   C. Avoid use of materials such as manure,or hay that may contain weed seed.

   D. Crop rotation

   E. Leveling land

INFORMATION SHEET

F. Seedbed preparation

IV. Six cultural practices used in weed control.

A. Crop rotation

B. Land leveling

C. Proper levee construction

D. Proper fertilization

E. Use of chemical control measures

F. Water planting

V. Three classes of weeds.

A. Weed grasses

B. Broadleaf, aquatic and sedge weeds

C. Algae

VI. Ten problem weeds.

A. Grasslike weeds

1. Barn yardgrass
2. Beakrush (spearhead)
3. Flatsedge
4. Fimbristylis (hoorahgrass)
5. Knotgrass
6. Nutsedge
7. Red Rice
8. Signal grass
9. Spikerush
10. Sprangletop

INFORMATION SHEET

B. Aquatic and Broadleaf

1. Alligatorweed
2. Redstem
3. Cattail
4. Cocklebur
5. Dayflower
6. Smartweed
7. Morningglory
8. Hemp Sesbania (Coffeebean)
9. Northern Jointvetch (Curly Indigo)
10. Ducksalad

C. Algae

VII. Four recommended chemicals for control of weeds.

A. Propanil

B. Molinate

C. 2-4 D

D. 2-4-5 T

VIII. Four advantages of early weed control.

A. Reduces length of competition (TM 2)

B. Smaller grass weeds are more easily controlled

C. Minimum rate of herbicides can be used

D. Allow rice plants to more fully utilize early fertilizer applications

NOTE: The best approach to weed control is an intergrated program which combines cultural, mechanical and herbicide practices.

INFORMATION SHEET

IX. What weeds cost the farmer each year.

  A. $20 million dollars in Arkansas each year

  B. Heavy infestation reduces yield as much as 50%

X. Five factors influencing the competative effects of specific weeds.

  A. Soil fertility

  B. Population

  C. Vigor

  D. Height

  E. Growth duration

GRASSLIKE WEED CONTROL IN RICE

	PROPANIL					
WEED	EARLY POST (WEEDS <2 in)	LATE POST (WEEDS > in)	MOLINATE (ORDRAM)	2,4-D	2,4,5-T and SILVEX	MCPA
Barnyardgrass	Exc.	Fair	Exc.	None	None	None
Beakrush (spearhead)	Fair	None	Poor	Good	Good	Good
Flatsedge, redroot and rice (umbrellasedge)	Fair-Good	Fair	Poor	Fair-Exc.	Fair-Exc.	Fair-Exc.
Fimbristylis (hoorahgrass)	Exc.	Fair	Poor	Exc.	Exc.	Exc.
Knotgrass	Fair	None	None	None	None	None
Nutsedge, false (straw-colored sedge) & yellow	Fair	None	None	Fair	Fair	Fair
Red Rice	None	None	Fair	None	None	None
Signalgrass, broadleaf (Brachiaria)	Exc.	None	Fair	None	None	None
Spikerush, blunt (annual)	Exc.	Fair	Exc.	Exc.	Exc.	Exc.
Sprangletop (tighthead)	Good	None	Poor	None	None	None
Bearded Sprangletop (loosehead)	Good	None	Fair	None	None	None

The degree of control is with recommended rates or with multiple applications.

AQUATIC BROADLEAF CONTROL IN RICE

WEEDS	2,4-D	2,4,5-T OR SILVEX	MCPA	EARLY POST (Weeds 2in)	LATE POST (WEEDS 2 in)	MOLINATE (ORDRAM)
Alligatorweed	Fair	Fair	Poor	None	None	None
Algae	None	None	None	None	None	None
Ammania, purple (Redstem)	Exc.	Exc.	Exc.	Good	Poor	None
Cattail, common	Good	None	None	Poor	None	Poor
Cocklebur	Exc.	Exc.	Exc.	Fair	Fair	None
Dayflower	Exc.	Exc.	Exc.	Fair	None	Fair
Ducksalad	Exc.	Good	Good	Exc.	Fair	Poor
Eclipta	Exc.	Exc.	Exc.	Exc.	Poor	Exc.
False pimpernel	Exc.	Exc.	Exc.	Good	None	None
Gooseweed	Fair	Good	Fair	Fair	None	None
Jointvetch, northern (curly indigo)	Good	Exc.	Good	Exc.	Fair	None
Morningglory	Exc.	Exc.	Exc.	Fair	Poor	None
Sesbania, hemp (coffeebean)	Exc.	Exc.	Good	Exc.	Exc.	None
Smartwood	Good	Good	Fair	Good	None	Good
Waterhyssop	Exc.	Exc.	Exc.	Exc.	Good	Poor
Waterprimrose	Good	Fair	Fair	None	None	None

WEED CONTROL

ASSIGNMENT SHEET #1 - PROBLEM WEED OF RICE

Survey ten rice fields in the students area. Find ten different weeds and identify and list control measures.

WEED	CONTROL MEASURES
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	

WEED CONTROL

ANSWERS TO ASSIGNMENT SHEETS

Assignment sheet #1

To the satisfaction of the instructor.

WEED CONTROL

TEST

I. Match the terms associated with weed control in rice to the correct definition.

___A. Cultural Practices

___B. Algae

___C. Herbicide

___D. Aquatic

___E. Weed

___F. Noxious

___G. Preventative

___H. Eradication

1. Mechanical control of weeds.
2. Any undesirable plant or a plant growing where it is not wanted.
3. A plant which for one or more reasons is especially undesirable.
4. Complete removal of a weed.
5. Keeping weeds from getting started.
6. Chemical weed killer.
7. Refers to growing in water.
8. One celled plant growing in water.

II. List six ways weeds interfere with rice production.

A.

B.

C.

D.

E.

F.

III. List six preventative measures for weed control.

A.

B.

C.

D.

E.

F.

IV. List six cultural practices used in weed control.

A.

B.

C.

D.

E.

F.

V. Name three classes of weeds.

A.

B.

C.

VI. List ten problem weeds from grasslike and aquatic weeds.

A.

B.

C.

D.

E.

F.

G.

H.

I.

J.

VII. Name three recommended chemicals for control of weeds.

A.

B.

C.

VIII. Name four advantages of early weed control.

A.

B.

C.

D.

IX. Discuss in a short paragraph, what weeds cost the farmer each year.

X. Name five factors influencing the competative effects of specific weeds.

A.

B.

C.

D.

E.

WEED CONTROL

ANSWERS TO TEST

I. A. 1
   B. 8
   C. 6
   D. 7
   E. 2
   F. 3
   G. 5
   H. 4

II. A. Compete for water
   B. Compete for nutrients
   C. Compete for light
   D. Reduce yields
   E. Increase cost of harvesting, drying and cleaning
   F. Reduce market value

III. A. Use weed free sand
   B. Use irrigation water free of weed seed
   C. Avoid use of materials such as manure and hay that may contain weed seed
   D. Crop rotation
   E. Leveling land
   F. Seedbed preparation

IV. A. Crop rotation
   B. Land leveling
   C. Proper levee construction

D. Proper fertilization

E. Use of chemical control measures

F. Water planting

V. A. Weed grasses

B. Broadleaf, aquatic and sedge weeds

C. Algae

VI. Any ten of the following:

A. Barn yardgrass

B. Beakrush

C. Flatsedge

D. Fimbristylis

E. Knotgrass

F. Nutsedge

G. Red Rice

H. Signal grass

I. Spikerush

J. Sprangletop

K. Alligatorweed

L. Redstem

M. Cattail

N. Cocklebur

O. Dayflower

P. Smartweed

Q. Morningglory

R. Hemp Sesbania

S. Northern Jointvetch

T. Ducksalad

VII. A. Propanil

B. Molinate

C. 2-4 D

D. 2-4-5 T

VIII. A. Reduces length of competition

B. Smaller grass weeds are more easily controlled

C. Minimum rate of herbicides can be used

D. Allow rice plant to become more fully utilized to early fertilizer applications

IX. Paragraph should include:

- A. $20 million dollars in Arkansas each year
- B. Heavy infestation reduces yield as much as 50%

X.
- A. Soil fertility
- B. Population
- C. Vigor
- D. Height
- E. Growth duration

SECTION B

UNIT VI

WATER MANAGEMENT

WATER MANAGEMENT

TERMINAL OBJECTIVE

After completion of this unit, the student should be able to discuss the recommended practices of water management for rice production. This knowledge will be evidenced by scoring at least eighty-five percent on the unit test.

SPECIFIC OBJECTIVES

After completion of this unit, the student should be able to:

I. Match terms associated with water management with correct definition.

II. List five ways water management effects the crop.

III. List four sources of water for irrigation.

IV. List two types of pumps used to water rice.

V. List five types of power used to run irrigation pumps.

VI. Discuss in a short paragraph, the amount of water pumped for rice.

VII. Discuss in a short paragraph, the depth of flood necessary for rice production.

VIII. List five things to consider when locating levees.

IX. List five facts about levee construction.

X. List three facts about levee gates.

XI. List three facts about water quality.

WATER MANAGEMENT

SUGGESTED ACTIVITIES

I. Instructor:

  A. Provide students with objective sheet.

  B. Provide students with information sheet.

  C. Prepare transparencies.

  D. Discuss terminal and specific objectives.

  E. Discuss information and assignment sheets.

  F. Take field trip.

  G. Give test.

II. Students:

  A. Read objective sheet.

  B. Study information sheet

  C. Demonstrate the ability to accomplish the procedure outlined in the assignment sheet.

  D. Take test.

INSTRUCTIONAL MATERIALS

I. Included in this unit:

  A. Objectives

  B. Information sheets

  C. Transparency master

    1. TM 1 - Effects of Water Management on Crop

  D. Assignment sheet

    1. Assignment sheet #1 - Water Management For Rice Production

E. Answers to assignment sheets

F. Test

G. Answers to test

II. References:

A. Rice In The Unites States; Varieties and Production, Agricultural Research Service, U.S. Department of Agriculture.

B. Water Management for Rice Production, E1566, Cooperative Extension Service.

WATER MANAGEMENT

INFORMATION SHEET

I. Terms and definitions:

   A. SEEPAGE - The movement of water through the soil.

   B. RUNOFF - The surface flow during a specific time.

   C. RESERVOIR - A man-made water holding facilities.

   D. RELIFTY - A type of pump used to pick up surface water and move it to another area.

   E. LEVEE - A mound of soil thrown up to hold water.

   F. LEVEE DISK - A type of plow used to construct levees.

   G. LEVEE GATES - Objects placed in the levees which are used to control the water level in the levee.

   H. G.P.M. - Gallons per minute.

II. Five ways water management effects the crop.

   A. Direct effect on rice seedling emergence

   B. Weeds

   C. Diseases

   D. Insect control

   E. Nitrogen conservation

III. Four sources of water for irrigation.

   A. Wells

   B. Reservoirs

   C. Streams

   D. Canals and ditches

IV. Two types of pumps used to water rice.

   A. Relifts

   B. Submersible pumps

INFORMATION SHEET

V. Five types of power used to run irrigation pumps.

- A. Electric power - 25% of existing units
- B. LP gas - 35%
- C. Gasoline - 20%
- D. Diesel - 15%
- E. Natural gas - 5%

VI. Amount of water pumped for rice.

- A. 30 inches per season
- B. Amount depends on:
  - 1. Seasonal rain fall
  - 2. Weeds
  - 3. Diseases
  - 4. Insect problem
  - 5. Soil type
  - 6. Water availability

VII. Flood depth necessary for rice production.

- A. 2-4 inches depth produces maximum yields and minimizes losses.

VIII. Five things to consider when locating levees.

- A. Accurate levee location and construction is essential for maintaining a uniform flood.
- B. Surveyed on contour at vertical intervals (fall of 0.1 to 0.2 foot between levees.)
- C. Smooth surface needed for accurate surveying.
- D. Surveying may be done with:
  - 1. Conventional surveying equipment
  - 2. Laser equipment

INFORMATION SHEET

E. Can be done before or after planting.

IX. Five facts about levee construction.

A. Levee disk used

B. 6 to 8 passes required

C. 9 foot average width from furrow to furrow

D. Blade used to make fills where levees join

E. Should be water tight to control seepage

X. Three facts about levee gates.

A. May be made of metal, wood, plastic or canvas

B. One gate per levee

C. May be installed by hand shoveling or tractor mounted equipment

XI. Three facts about water quality.

A. Temperature should be 77° to 84° F.

B. Should not contain more than 600 parts per million of soluble salts.

C. Use of poor quality water may cause yellowing and death of rice seedlings.

EFFECTS OF WATER MANAGEMENT ON CROPS

A. Direct effect on rice seedling emergence

B. Weeds

C. Diseases

D. Insect Control

E. Nitrogen Conservation

WATER MANAGEMENT

ASSIGNMENT SHEET #1 - WATER MANAGEMENT FOR RICE PRODUCTION

Survey ten rice growers in the student area. Find what water management practices each uses and reasons why these were selected.

PRACTICES	REASONS

WATER MANAGEMENT

Assignment sheet #1

To the satisfaction of the instructor.

WATER MANAGEMENT

TEST

I. Match the terms listed below to the correct definition.

___A. The movement of water through the soil.

___B. Gallons per minute.

___C. The surface flow during a specific time.

___D. Objects placed in the levees which are used to control the water level within the levee.

___E. A mound of soil thrown up to hold water.

___F. A man-made water holding facilities.

___G. A type of plow used to construct levees.

___H. A type of pump used to pick up surface water and move it to another area.

1. Seepage
2. Runoff
3. Reservoir
4. Relifty
5. Levee
6. Levee disk
7. Levee gate
8. G.P.M.

II. List five ways water management effects crops.

A.

B.

C.

D.

E.

III. List four sources of water for irrigation.

A.

B.

C.

D.

IV. List two types of pumps used to water rice.

A.

B.

V. List five types of power used to run irrigation pumps.

A.

B.

C.

D.

E.

VI. Discuss in a short paragraph, the amount of water pumped for rice.

VII. Discuss in a short paragraph, the depth of flood necessary for rice production.

VIII. List five things to consider when locating levees.

A.

B.

C.

D.

E.

IX. List five facts about levee construction.

A.

B.

C.

D.

E.

X. List three facts about levee gates.

A.

B.

C.

XI. List three facts about water quality.

A.

B.

C.

WATER MANAGEMENT

ANSWERS TO TEST

I. A. 1
    B. 8
    C. 2
    D. 7
    E. 5
    F. 3
    G. 6
    H. 4

II. A. Direct effect on rice seedling emergence
    B. Weeds
    C. Diseases
    D. Insect control
    E. Nitrogen conservation

III. A. Wells
    B. Reservoirs
    C. Streams
    D. Canals and ditches

IV. A. Relifts
    B. Submersible pumps

V. A. Electric power
    B. LP gas
    C. Gasoline
    D. Diesel
    E. Natural gas

VI. Paragraph should include:

- A. 30 inches per season
- B. Amount depends on:
  - 1. Seasonal rain fall
  - 2. Weeds
  - 3. Diseases
  - 4. Soil type
  - 5. Insect problem
  - 6. Water availability

VII. Paragraph should include:

- A. 2-4 inches depth produces maximum yields and minimizes losses.

VIII.

- A. Accurate levee location and construction is essential for maintaining a uniform flood.
- B. Surveyed on contour at vertical intervals (fall of 0.1 to 0.2 foot between levees).
- C. Smooth surface needed for accurate surveying.
- D. Surveying may be done with:
  - 1. Conventional surveying equipment
  - 2. Laser equipment
- E. Can be done before or after planting.

IX.

- A. Levee disk used
- B. 6 to 8 passes required
- C. 9 foot average width from furrow to furrow
- D. Blade used to make fills where levees join
- E. Should be water tight to control seepage

X.

- A. May be made of metal, wood, plastic or canvas
- B. One gate per levee
- C. May be installed by hand shoveling or tractor mounted equipment

XI. A. Temperature should be 77° to 84° F.

B. Should not contain more than 600 parts per million of soluble salts.

C. Use of poor quality water may cause yellowing and death of rice seedlings.

SECTION B

UNIT VII

RICE DISEASES

RICE DISEASES

TERMINAL OBJECTIVE

After completion of this unit, the student should be able to recognize and control the major diseases of rice. This knowledge will be evidenced through demonstration and by scoring at least eighty-five percent on the unit test.

SPECIFIC OBJECTIVES

After completion of this unit, the student should be able to:

I. Match terms associated with rice diseases to correct definition.

II. Name seven control measures for rice diseases.

III. List three factors essential for the development of a pathogenic disease.

IV. Construct a chart, when given the diesases, telling symptoms of the disease and method of control.

V. Survey the rice diseases common in your area.

RICE DISEASES

SUGGESTED ACTIVITIES

I. Instructor:
   - A. Provide students with objective sheet.
   - B. Provide students with information sheet.
   - C. Prepare transparencies.
   - D. Discuss terminal and specific objectives.
   - E. Discuss information and assignment sheets.
   - F. Take field trip.
   - G. Give test.

II. Students:
   - A. Read objectives.
   - B. Study information sheets.
   - C. Demonstrate the ability to accomplish the procedures outlined in the assignment sheets.
   - D. Take test.

INSTRUCTIONAL MATERIALS

I. Included in this unit:
   - A. Objectives
   - B. Information sheet
   - C. Transparency masters
     - 1. TM 1 - Resistance of Rice Varieties To Diseases
   - D. Assignment sheet
     - 1. Assignment sheet #1 - Disease Identification
   - E. Answers to assignment sheet

F. Test

G. Answers to test

II. References:

A. Extension Service: Leaflet 198, Circular 476.

B. Rice In The United States: Varieties and Production, USDA Handbook No. 289.

RICE DISEASES

INFORMATION SHEET

I. Terms and definitions:

   A. FUNGUS - A plant which lacks chlorophyll and obtains its food from other plant matter, dead or alive.

   B. BACTERIA - One celled microorganism which may be disease producing.

   C. VIRUS - A minute, protein like substance capable of causing diseases.

   D. RESISTANT - The inherited ability of a plant to retard growth of disease organisms.

   E. HOST - The plant in which the disease lives and obtains food.

   F. DISEASE - A condition other than normal for a plant.

   G. LESION - A localized spot or diseased tissue.

   H. FUNGICIDE - A chemical used to kill fungi.

II. Control measures for rice diseases.

   A. Good quality seed

   B. Disease-resistant varieties

   C. Treat seed with fungicide

   D. Fertilize properly

   E. Crop rotation

   F. Good seedbed preparation

   G. Proper draining

   H. Control grasses and other weeds

III. Three factors essential for the development of a pathogenic disease.

   A. A susceptible host

INFORMATION SHEET

B. Casual organism

C. Environment favorable for disease development

IV. Major diseases of rice and control measures.

DISEASE CHARACTERISTICS AND CONTROL MEASURES

DISEASE	DESCRIPTION	CONTROL MEASURES
Seedling Blight	Poor seedling development and often death of plants. Yellowish, generally weak, plants which may result from alkaline or saline injury may be confused with seedling blight.	Treat seed and delay planting until soil and weather conditions are favorable for rapid germination and growth. The daily mean temperature should be about 70° F.
Brown leaf Spot	Circular or oval leaf spots 1/16" to 1/8" in diameter and dark brown in color. Severe infection may cause death of leaves. Infection may occur during seedling stage of growth on rice stem below head and on rice kernels or hulls as well as on the leaves.	1. Seed treatment 2. Balanced fertilization and proper timing 3. Crop rotation 4. Good seedbed preparation 5. Good water management 6. Proper timing of herbicides
Stem rot	Irregular shaped, water soaked areas on the sheath at, or just below water line. Area turns black, becomes larger and may enter the stalk. Advanced stages reveal a cottony grayish mold with black fruiting bodies inside the stalk. Fungus spores may live in soil and rice stubble 5 or 6 years following an infected crop. At maturity stalks break over at water line and lodge.	1. Balanced fertilization 2. Proper draining 3. Crop rotation

INFORMATION SHEET

DISEASE CHARACTERISTICS AND CONTROL MEASURES

DISEASE	DESCRIPTION	CONTROL MEASURES
Rotten Neck Blast	Affected heads usually break over at infected area. Early infected heads may remain erect. Leaf symptoms when present are diamond shaped brown spots with grayish centers that develop rapidly.	1. Plant resistant varieties when available 2. Avoid excessively high nitrogen fertilization, reservoir and newly cleared land when using susceptible varieites. 3. Use proper timing of split applications of nitrogen fertilizer.
Straighthead	Heads remain upright at maturity. Florets on long grain have parrot beak appearance. Frequently occurs on sandy loam soils and first year rice on new ground. Seldom occurs on clay soils.	1. Timely drainage until surface soil crusts. 2. Seed most tolerant varieties in problem areas.
Kernel Smut	Scattered kernels in affected heads are converted to a black mass of smut spores. Dew drops hanging from infected kernels are often black.	1. Avoid excessive rates of nitrogen and improper timing of nitrogen. 2. Follow recommendations on timing carefully.
Bordered Sheath Spot	Large brownish bordered spot appear on the sheath above the water line and sometimes on the lower leaves. May cause circular spots of dead plants at harvest.	Disease is considered minor but damage may be severe. Follow good management practices to avoid excessive vegetative growth.

Degree of susceptibility 1-Least susceptible
9-Most susceptible

RESISTANCE OF RECOMMENDED RICE VARIETIES

VARIETY	GRAIN TYPE	SHEATH BLIGHT	BLAST	STEM ROT	STRAIGHT HEAD	KERNEL SMUT	BROWN SPOT
Starbonnet	Long	6	8	7	3	6	6
Bonnet 13	Long	6	6	7	3	7	4
Lebonnet	Long	8	2	7	3	4	4
Labelle	Long	8	2	6	2	5	5
Nato	Medium	5	8	6	6	6	5
Nova 76	Medium	5	4	5	7	4	5
Brazos	Medium	7	8	5	5	3	6
Nortai	Short	4	4	5	2	2	4

RICE DISEASES

ASSIGNMENT SHEET #1 - DISEASE IDENTIFICATION

Collect and identify five types of diseases that are common to rice.

PLACE COLLECTED	NAME OF DISEASE	CONTROL MEASURE

RICE DISEASES

ANSWERS TO ASSIGNMENT SHEETS

Assignment sheet #1

To the satisfaction of the instructor.

RICE DISEASES

TEST

I. Match the terms listed below to the correct definition.

___A. Fungus

___B. Bacteria

___C. Virus

___D. Resistant

___E. Host

___F. Disease

___G. Lesion

___H. Fungicide

1. A localized spot or diseased tissue.
2. A one celled microorganism which may be disease producing.
3. The plant in which the disease lives and obtains food.
4. A chemical substance used to kill fungi.
5. A condition other than normal for a plant.
6. The inherited ability of a plant to retard growth of disease organisms.
7. A minute protein like substance capable of causing diseases.
8. A plant which lacks chlorophyll and obtains its food from other plant matter, dead or alive.

II. Name seven control measures for rice diseases.

A.

B.

C.

D.

E.

F.

G.

III. List three factors essential for the development of a pathogenic disease

A. B. C.

IV. Construct a chart below telling symptoms of the disease and method of control.

DISEASES	DESCRIPTION	CONTROL MEASURES
1. Seedling Blight		
2. Brown Leaf Spot		
3. Stem Rot		
4. Rotten Neck Blast		
5. Straighthead		
6. Kernel Smut		
7. Bordered Sheath Spot		

V. Turn in assignment sheet #1 - Disease Identification

RICE DISEASES

ANSWERS TO TEST

I. A. 8

B. 2

C. 7

D. 6

E. 3

F. 5

G. 1

H. 4

II. Any seven of the follwoing:

A. Good quality seed

B. Disease-resistant varieties

C. Treat seed with fungicide

D. Fertilize properly

E. Crop rotation

F. Good seedbed preparation

G. Proper draining

H. Control grasses and other weeds

III. A. A susceptible host

B. Casual organism

C. Environment favorable for disease development

IV. Refer to information sheet. To the satisfaction of the instructor.

V. To the satisfaction of the instructor.

SECTION B

UNIT VIII

HARVESTING, STORAGE AND MARKETING

HARVESTING, STORAGE AND MARKETING

TERMINAL OBJECTIVE

After completion of this unit, the student should be able to discuss principles of harvesting, storage and marketing of rice. This knowledge will be evidenced by scoring at least eighty-five percent on the unit test.

SPECIFIC OBJECTIVES

After completion of this unit, the student should be able to:

I. Match terms associated with harvesting, storage and marketing of rice.

II. List the most common methods of harvesting rice.

III. List three factors determining when to harvest.

IV. Name three disadvantages of early harvesting.

V. Discuss in a short paragraph, disadvantages of late harvesting.

VI. Discuss in a short paragraph, drying of rice.

VII. Name three results of improper drying.

VIII. List six facts about the condition of storage bins.

IX. Name two factors determining the value of rice.

X. List five factors determining the grade of rice.

XI. Name two markets for rice.

HARVESTING, STORAGE AND MARKETING

SUGGESTED ACTIVITIES

I. Instructor:
    A. Provide students with objective sheet.
    B. Provide students with information sheets.
    C. Prepare transparencies.
    D. Discuss terminal and specific objectives.
    E. Discuss information and assignment sheets.
    F. Take field trip.
    G. Give test.

II. Students:
    A. Read objective sheet.
    B. Study information sheet.
    C. Demonstrate the ability to accomplish the procedure outlined in the assignment shset.

INSTRUCTIONAL MATERIALS

I. Included in this unit:
    A. Objectives
    B. Information sheets
    C. Transparency masters
        1. TM 1 - Standards for Rough Rice
    D. Assignment sheet
        1. Assignment sheet #1 - Marketing Rice
    E. Answers to assignment sheets
    F. Test

G. Answers to test

II. References:

A. Rice in the United States; Varieties and Production, Agriculture Handbook No. 289, Agricultural Research Service, U.S. Department of Agriculture.

B. Cooperative Extension Service, Circular 476, Rice Production in Arkansas.

HARVESTING, STORAGE AND MARKETING

INFORMATION SHEET

I. Terms and definitions:

   A. MILLING YIELD - The total yield after milling.

   B. CHECKING - Breaking of the kernel.

   C. GRADE - A measure of the quality of the rice.

   D. COMBINE - A piece of farm machinery used to harvest rice.

   E. MOISTURE CONTENT - Amount of moisture in kernel.

   F. FUMIGATION - Treating bins with a chemical to control insects.

   G. ROUGH RICE - Rice with hulls on as it comes from the combine.

   H. HEAD RICE - Whole kernels of rice.

   I. RICE HULLS - The outer covering of the rice kernel removed in shelling.

   J. POLISHED RICE - Rice from which the hulls, germ, outer bran layers and most of the inner bran layers have been removed.

II. Most common methods of harvesting rice.

   A. Self propelled combine

   B. Most efficient and economic method

III. Factors determining when to harvest.

   A. Moisture content between 17 and 23 percent

   B. The heads turned downward

   C. Kernels in lower part of head are in hard dough stage

IV. Three disadvantages of early harvesting.

   A. Have a high percentage of chalky kernels

   B. Reduced yields

INFORMATION SHEET

- C. Reduced total milled rice

V. Disadvantages of late harvesting.

- A. Shattering loss
- B. Reduction yield due to checking during milling process

VI. Drying of rice.

- A. Moisture must be removed from inside the kernel.
- B. Passed through a heated air dryer.
- C. Temperature 110° - 130° F.
- D. In bin drying, limit rice depth to 8 feet.
- E. Apply 2 cubic feet of air per minute per bushel.
- F. Reduce moisture content to below 12 percent.

VII. Three results of improper drying.

- A. Reduced milling quality
- B. Reduced germination
- C. Could result in complete loss of crop

VIII. Condition of storage bins.

- A. Clean
- B. Dry
- C. Weather-proof
- D. Rodent-proof
- E. Insect-proof
- F. Airtight for fumigation

IX. Two factors determining the value of rice.

- A. Value determined by grade
- B. Milling yield

INFORMATION SHEET

X. Five factors determining grade of rice.
    A. Seed
    B. Heat-damaged
    C. Red Rice
    D. Chalky Kernels
    E. Rice of other classes

XI. Two markets for rice.
    A. Domestic
    B. Foreign

STANDARDS FOR ROUGH RICE

Grade	Maximum limits of —						Color requirements[2]
	Seeds and heat damaged kernels		Red rice and damaged kernels (singly or combined)	Chalky Kernels		Rice of other classes[1]	
	Total (singly or combined)	Heat damaged kernels and objectionable seeds (singly or combined)		In long-grain rice	In short- and medium-grain rice		
	Number in 500 grams	Number in 500 grams	Percent	Percent	Percent	Percent	
U. S. No. 1	2	1	0.5	1.0	2.0	1.0	Shall be white or creamy
U. S. No. 2	4	2	1.5	2.0	4.0	2.0	May be slightly gray
U. S. No. 3	7	5	2.5	4.0	6.0	3.0	May be light gray
U. S. No. 4	20	15	4.0	6.0	8.0	5.0	May be gray or slightly rosy
U. S. No. 5	30	25	6.0	10.0	10.0	10.0	May be dark gray or rosy
U. S. No. 6	75	75	15.0[3]	15.0	15.0	10.0	May be dark gray or rosy
U. S. sample grade	U. S. sample grade shall be rough rice which does not meet the requirements for any of the grades from U. S. No. 1 to U. S. No. 6 inclusive; or which contains more than 14.0 percent of moisture; or which is musty, or sour, or heating; or which has any commercially objectionable foreign odor; or which is otherwise of distinctly low quality.						

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[1] These limits do not apply to the class "mixed rough rice."

[2] These color requirements are not applicable to "parboiled rough rice."

[3] The rice in grade U. S. No. 6 may contain not more than 6.0 per cent damaged kernels.

HARVESTING, STORAGE AND MARKETING

ASSIGNMENT SHEET #1 - MARKETING RICE

Survey ten rice growers in the students area. Find out what marketing procedure each uses.

Farmers Name	Procedure
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	

HARVESTING, STORAGE AND MARKETING

ANSWERS TO ASSIGNMENT SHEETS

Assignment sheet #1

To the satisfaction of the instructor.

HARVESTING, STORAGE AND MARKETING

TEST

I. Match the terms listed below with the correct definition.

___1. Treating bins with a chemical to control insects.

___2. Rice from which the hulls, germ, outer bran layers and most of the inner bran layers have been removed.

___3. A measure of the quality of the rice.

___4. Breaking of the kernel.

___5. Whole kernels of rice.

___6. A piece of farm machinery used to harvest rice.

___7. The outer covering of the rice kernel removed in shelling.

___8. Rice with hulls on as it comes from the combine.

___9. The amount of moisture the kernel contains.

___10. The total yield after milling.

A. Milling Yield

B. Checking

C. Grade

D. Combine

E. Moisture Content

F. Fumigation

G. Rough Rice

H. Red Rice

I. Rice Hulls

J. Polished Rice

II. List the most common methods of harvesting rice.

A.

B.

III. List three factors determining when to harvest.

A.

B.

C.

IV. Name three disadvantages of early harvesting.

A.

B.

C.

V. Discuss in a short paragraph, disadvantages of late harvesting.

VI. Discuss in a short paragraph, drying of rice.

VII. Name three results of improper drying.

A.

B.

C.

VIII. List six facts about the condition of storage bins.

A.

B.

C.

D.

E.

F.

IX. Name two factors determining the value of rice.

A.

B.

X. List five factors determining the grade of rice.

A.

B.

C.

D.

E.

XI. Name two markets for rice.

A.

B.

HARVESTING, STORAGE AND MARKETING

ANSWERS TO TEST

I.
1. F
2. J
3. C
4. B
5. H
6. D
7. I
8. G
9. E
10. A

II.
A. Self propelled combine
B. Most efficient and economical method

III.
A. Moisture content between 17 and 23 percent
B. The head turned downward
C. Kernels in lower part of head are in hard dough stage

IV.
A. Have a high percentage of chalky kernels
B. Reduced yields
C. Reduced total milled rice

V. Paragraph should include:
A. Shattering loss
B. Reduction yield due to checking during milling process

VI. Paragraph should include the following :
A. Moisture must be removed from inside the kernel

B. Passed through a heated air dryer

C. Temperature 110° - 130° F.

D. In bin drying, limit rice depth to 8 feet

E. Apply 2 cubic feet of air per minute per bushel

F. Reduce moisture content to below 12 percent

VII. A. Reduced milling quality

B. Reduced germination

C. Could result in complete loss of crop

VIII. A. Clean

B. Dry

C. Weather-proof

D. Rodent-proof

E. Insect-proof

F. Airtight for fumigation

IX. A. Value determines by grade

B. Milling yield

X. A. Seed

B. Heat damaged

C. Red Rice

D. Chalky kernels

E. Rice of other classes

XI. A. Domestic

B. Foreign

SECTION C

UNIT I

JOB ORIENTATION

JOB ORIENTATION

TERMINAL OBJECTIVE

After completion of this unit, the student should be able to match terms associated with soybean and rice production to proper definition, select sources to use in finding a job and list the occupational areas of soybean and rice production. This knowledge will be evidenced through demonstration and by scoring at least eighty-five percent on the unit test.

SPECIFIC OBJECTIVES

After completion of this unit, the student should be able to:

I. Match terms associated with soybean and rice production to the correct definition.

II. Select from a list, sources to use in finding a job.

III. Select from a list, the factors that should be considered when choosing an occupation.

IV. Select from a list, the expectations an employer has of their employees.

V. Select from a list, the expectations employees have of their employer.

VI. Select from a list, steps to take in obtaining a job.

VII. List information to be supplied to an employer.

VIII. List ten occupational areas of soybeans and rice production.

IX. Complete a self information sheet.

X. Complete a soybean and rice production worksheet.

JOB ORIENTATION

SUGGESTED ACTIVITIES

I. Instructor:

  A. Provide students with objective sheet.

  B. Provide students with information sheet.

  C. Discuss unit and specific objectives.

  D. Discuss information and assignment sheets.

  E. Give test

II. Students:

  A. Read objective sheet

  B. Study information sheet

  C. Complete assignment sheet

  D. Take test

INSTRUCTIONAL MATERIALS

I. Included in this unit:

  A. Objectives

  B. Information sheet

  C. Assignment sheets

    1. Assignment sheet #1 - Self Information

    2. Assignment sheet #2 - Soybean and Rice Worksheet

  D. Answers to assignment sheets

  E. Test

  F. Answers to test

JOB ORIENTATION

INFORMATION SHEET

I. Terms and definitions:

   A. AGRICULTURE - Science or art of cultivating the soil, producing crops, raising livestock and all other aspects of preparing these products to move to the consumer.

   B. APTITUDE TEST - Helps people single out facts about themselves in relation to their career interests.

   C. JOB DESCRIPTION - An outline of the duties to be performed on a particular job.

   D. JOB ANALYSIS - Study of each task that is performed on a job.

II. Sources to use in finding jobs.

   A. Department of Labor

   B. School Placement Bureau

   C. Former Instructors

   D. Former Employers

   E. Want Advertisements

   F. State Employment Service

   G. Letter of Inquiry

   H. Friends

   I. Relatives

   J. Personnel Offices

III. Factors that should be considered when choosing an occupation.

   A. Interest

   B. Hobbies

   C. Salary

   D. Advancement Opportunities

INFORMATION SHEET

- E. Location
- F. Working Conditions
- G. Security for the future
- H. Safety

IV. Expectation of an employer:

- A. Honesty
- B. Loyalty
- C. Good work habits
- D. Cooperation
- E. Good working relationships
- F. Use of your abilities

V. Expectations of an employee:

- A. Financial compensation
- B. Good working conditions
- C. Security
- D. Recognition of accomplishments
- E. Benefits

VI. Steps to take in obtaining a job.

- A. Select your field
- B. Locate job prospects
- C. Prepare a personal resume
- D. Fill out application forms
- E. Schedule an interview
- F. Interview

VII. Information to be supplied to an employer.

- A. References

INFORMATION SHEET

B. Academic transcript or record

C. List of related experiences

D. Social Security Number

E. Dependents

VIII. Occupational areas of soybean and rice production.

A. Farm labor

B. Fertilizers and chemicals

C. Grain dryer operators

D. Rice and soybean mill managers

E. Rice and soybean mill superintendent

F. Supervisors

G. Machine operator personnel

H. Technical laboratory technicians

I. Maintenance personnel

J. Shipping personnel

K. Rice and soybean grades

L. Rice and soybean distributors

M. Experimental personnel

N. General labor personnel

JOB ORIENTATION

ASSIGNMENT SHEET #1 - SELF INFORMATION SHEET

Directions: Complete this form for your own personal use.

SELF INFORMATION

Education:

Courses studied:

Courses you did well in:

Courses you did least well in:

Course you enjoyed the most:

Why?

Course you enjoyed the least:

Why?

School Activities:

List school activities you have been involved in:

Personal Data:

List your strong points:

List your weak points:

How well do you get along with people?

What personal satisfaction do you derive from work?

Other information you feel would be important:

Job Experience:

List jobs that you have had:

1.

ASSIGNMENT SHEET #1

Which job did you like the best?

Explain:

Hobbies:

1.

2.

3.

4.

Health:

What is the status of your health?

List any physical handicaps:

Occupational Choice:

List three jobs that you feel at this time you would be most happy with and explain each.

1.

2.

3.

JOB ORIENTATION

ASSIGNMENT SHEET #2 - RICE AND SOYBEAN WORKSHEET

Survey the local community for employment opportunities related to rice and soybean production. Make a list of these businesses and the products and services offered to the community.

Agriculture Businesses	Products and Services Offered to the Community

JOB ORIENTATION

ANSWERS TO ASSIGNMENT SHEETS

Assignment sheet #1

To the satisfaction of the instructor.

Assignment sheet #2

To the satisfaction of the instructor.

JOB ORIENTATION

TEST

I. Match terms associated with rice and soybean production to the correct definition.

1. Study of each task that is performed on a job.
2. Helps people single out facts about themselves in relation to their career interests.
3. Science or art of cultivating the soil, producing crops, raising livestock and all other aspects of preparing these products to move to the consumer.
4. An outline of the duties to be performed on a particular job.

___A. Agriculture

___B. Aptitude Test

___C. Job Description

___D. Job Analysis

II. Select from the list, sources to use in finding a job by placing an "X" in the appropriate blank.

___A. Department of Labor

___B. School Placement Bureau

___C. Former Instructor

___D. Former Employers

___E. Want advertisements

___F. Friends and Relatives

___G. Carrying a Gun

___H. State Employment Service

___I. Personnel Offices

III. Select from the list, factors that should be considered when choosing an occupation.

___A. Interest

___B. Hobbies

___C. Salary

___D. Advancement opportunities

___E. Location

___F. Working conditions

___G. How much you weigh

___H. Security for the future

___I. Safety

___J. What you wear

IV. Select from the list, the expectations employers have of their employees.

___A. Honesty

___B. Rebate

___C. Proper use of ability

___D. Loyalty

___E. Good working relationships

___F. Cooperation

___G. Good work habits

V. Select from the list, the expectations employees have of their employers.

___A. Financial compensation

___B. Good working conditions

___C. Security

___D. Recognition of accomplishment

___E. Benefits

VI. Select from the list, steps to take in obtaining a job.

___A. Select your field

___B. Locate job prospects

___C. Prepare a personal resume

___D. Fill out application forms

___E. Drivers license

___F. Schedule an interview

___G. Interview

___H. Marriage license

___I. Birth Certificate

VII. List information to be supplied to an employer.

A.

B.

C.

D.

E.

VIII. List ten occupational areas of rice and soybean production.

A.

B.

C.

D.

E.

F.

G.

H.

I.

J.

JOB ORIENTATION

ANSWERS TO TEST

I. A. 3
   B. 2
   C. 4
   D. 1

II. An "X" should be in each blank except G.

III. An "X" should be in each blank except G and J.

IV. An "X" should be in each blank except B.

V. An "X" should be in each blank.

VI. An "X" should be in each blank except E, H and I.

VII. A. References
     B. Academic transcript or record
     C. List of related experiences
     D. Social Security Number
     E. Dependents

VIII. To the satisfaction of the instructor.

IX. Turn in assignment sheet #1. To be evaluated by the instructor.

X. Turn in assignment sheet #2. To be evaluated by the instructor.